DATACOM

DM4000 Series - Installation and Operation Guide

204.0112.10

Revision History

Revision 10 2010/10/18
New interface boards included
Revision 09 2010/01/21
New interface boards included
Revision 08 2009/09/24
New pictures included
Revision 07 2009/05/19
SFP pictures and new interface boards included
Revision 06 2008/12/02
New pictures included
Revision 05 2008/06/24
Transceivers homologation check included
Revision 04 2008/01/23
CE mark information and new pictures included
Revision 03 2008/01/15
Power supply connectors information included
Revision 02 2007/11/21
General updates
Revision 01 2007/11/07
General updates
Revision 00 2007/10/22
First Version

Warranty

This product is guaranteed to be free against manufacturing and raw material defects, during the period specified in the sales receipt.

The warranty includes only the repair and replacement of components or defective parts, free of charge. The warranty does not cover damages caused by any one of the following conditions: improper use, energy failures, natural phenomena (lightning, for example), failure in equipments connected to this product, improper grounding or repairs done by DATACOM unauthorized personnel.

This warranty does not cover repairs done at the customer's site. All equipments must be sent to DATACOM to be repaired.

Quality Management System
certified by DQS according to ISO9001
Register number (287097 QM)

MEF 9 (EPL, EVPL, ELAN)
MEF 14 (EPL, EVPL, ELAN)
Certified

Although this document has been written with care, the company does not assume responsibility for occasional mistakes and omissions in its content. Likewise, DATACOM is not liable for any damages that may result from the use of the information contained in this manual. Specifications provided in this manual are subject to changes without any previous notice and should not be construed as a commitment of any kind by DATACOM.

Contact Information

In order to contact the DATACOM technical support, or sales department:

- Support:
  - E-mail: suporte@datacom.ind.br
  - Phone: +55 51 3358-0122
  - Fax: +55 51 3358-0101
- Sales:
  - E-mail: comercial@datacom.ind.br
  - Phone: +55 51 3358-0100
  - Fax: +55 51 3358-0101
- Internet:
  - www.datacom.ind.br
- Address:
  - DATACOM
  - Av. França, 735 - Porto Alegre, RS - Brasil
  - CEP: 90230-220

Conventions

General Information:

Symbol	Description
	Notes give an explanation about some topic in the foregoing paragraph.

Safety information

Symbol	Description
	Generic alarm symbol: To suggest a general safety
	ESD protection symbol: To suggest electrostatic-sensitive equipment
	Electric shock symbol: To suggest a danger of high voltage
	Microwave symbol: To suggest a high-intensity electromagnetic field
	Laser symbol: To suggest a strong laser beam

Table of Contents

1. General Recommendation....1
1.1. Before the Installation....1
2. Introduction....3
2.1. About this guide....3
2.2. Overview....3
3. Technical Specifications....7
3.1. Environmental Conditions....7
3.2. Power Supply....7
3.2.1. DM4001....7
3.2.2. DM4004....8
3.2.3. DM4008....9
3.2.4. Interface Modules....9
3.3. Dimensions....10
3.4. Weight....10
4. DM4001 Chassis....13
4.1. Overview....13
4.2. Front Panel Description....13
4.3. System Status LEDs....14
4.4. Console and Ethernet Outband Management Ports....15
4.5. Rear Panel Description....16
5. DM4004 Chassis....17
5.1. Overview....17
5.2. Front Panel Description....18
5.3. Rear Panel Description....19
5.4. Console Management Port....20
6. DM4008 Chassis....22
6.1. Overview....22
6.2. Front Panel Description....22
6.3. Rear Panel Description....23
6.4. Console Management Port....24
7. DM4000 MPU192....26
7.1. Overview....26
7.2. Front Panel Description....27
7.3. System Status LEDs....27
7.4. Console and Ethernet Outband Management Ports....28
8. DM4000 MPU384....30
8.1. Overview....30
8.2. Front Panel Description....31
8.3. System Status LEDs....31
8.4. Console and Ethernet Outband Management Ports....32

9. DM4000 MPU416 34
9.1. Overview 34
9.2. Front Panel Description 35
9.3. System Status LEDs 35
9.4. Console and Ethernet Outband Management Ports 36
10. DM4000 ETH24GX 38
10.1. Overview 38
10.2. Front Panel Description 39
10.3. System Status LEDs 39
10.4. Software and Hardware Features 40
10.4.1. Software 40
10.4.2. Hardware 40
11. DM4000 ETH24GX H Series 42
11.1. Overview 42
11.2. Front Panel Description 42
11.3. System Status LEDs 43
11.4. Software and Hardware Features 44
11.4.1. Software 44
11.4.2. Hardware 44
12. DM4000 ETH12GX 46
12.1. Overview 46
12.2. Front Panel Description 47
12.3. System Status LEDs 47
12.4. Software and Hardware Features 48
12.4.1. Software 48
12.4.2. Hardware 48
13. DM4000 ETH12GX+1x10GX 50
13.1. Overview 50
13.2. Front Panel Description 51
13.3. System Status LEDs 51
13.4. Software and Hardware Features 52
13.4.1. Software 52
13.4.2. Hardware 52
14. DM4000 ETH2x10GX 54
14.1. Overview 54
14.2. Front Panel Description 55
14.3. System Status LEDs 56
14.4. Software and Hardware Features 56
14.4.1. Software 56
14.4.2. Hardware 56
15. DM4000 ETH24GT 58
15.1. Overview 58
15.2. Front Panel Description 58
15.3. System Status LEDs 59
15.4. Software and Hardware Features 60

15.4.1. Software 60
15.4.2. Hardware 60
16. DM4000 ETH48GT 62
16.1. Overview 62
16.2. Front Panel Description 62
16.3. System Status LEDs 63
16.4. Software and Hardware Features 64
16.4.1. Software 64
16.4.2. Hardware 64
17. DM4000 ETH48GX H Series 66
17.1. Overview 66
17.2. Front Panel Description 66
17.3. System Status LEDs 67
17.4. Software and Hardware Features 68
17.4.1. Software 68
17.4.2. Hardware 68
18. DM4000 ETH24GX+2x10GX H Series 70
18.1. Overview 70
18.2. Front Panel Description 70
18.3. System Status LEDs 71
18.4. Software and Hardware Features 72
18.4.1. Software 72
18.4.2. Hardware 72
19. DM4000 ETH2x10GX H Series 74
19.1. Overview 74
19.2. Front Panel Description 74
19.3. System Status LEDs 75
19.4. Software and Hardware Features 76
19.4.1. Software 76
19.4.2. Hardware 76
20. DM4000 ETH4x10GX H Series 78
20.1. Overview 78
20.2. Front Panel Description 78
20.3. System Status LEDs 79
20.4. Software and Hardware Features 80
20.4.1. Software 80
20.4.2. Hardware 80
21. DM4000 GPC-OAB 82
21.1. Overview 82
21.2. Front Panel Description 83
22. DM4000 GPC-OAP 84
22.1. Overview 84
22.2. Front Panel Description 85

23. DM4000 GPC-DCM 86
23.1. Overview 86
23.2. Front Panel Description 87
24. Fan Board 88
24.1. Description 88
24.2. Air Flow 89
24.2.1. DM4004 and DM4008 Chassis 89
25. Installation Guide 91
25.1. Installation Kit 91
25.2. Powering the Switch 92
25.2.1. Cables 94
25.3. Installing the FAN Module in the Chassis 96
25.4. Removing the FAN Module of the Chassis 97
25.5. Inserting the Interface Board in the Chassis 98
25.6. SFP Module 100
25.6.1. Connecting a SFP Module 101
25.6.2. Removing SFP Modules 102
25.6.3. Transceivers Homologation Check 103
A. Cable DB9-RJ-45 104
A.1. Construction 104
B. Optical Amplifiers 106
B.1. How to connect an optical amplifier and a interface board 106
C. Applicable Standards 107
C.1. Applicable Standards for DM4000 family 107

List of Tables

3-1. Recommended Power Limits and Consumption Parameters for DM4001 7
3-2. Absolute Power Limits for DM4001 ..... **??**
3-3. Recommended Power Limits and Consumption Parameters for DM4004 8
3-4. Absolute Power Limits for DM4004 8
3-5. Recommended Power Limits and Consumption Parameters for DM4008 9
3-6. Absolute Power Limits for DM4008 9
3-7. Consumption and Fuse 9
3-8. Chassis 10
3-9. FANs 10
3-10. MPUs 11
3-11. Interface Boards 11
3-12. GPC Boards 11
3-13. Blank Panels 11
4-1. System LEDs DM4001 Chassis 15
4-2. Interface Pinout 16
5-1. DB9 Pins Specification 21
6-1. DB9 Pins Specification 25
7-1. MPU192 System LEDs 28
7-2. Interface Pinout 29
8-1. MPU384 System LEDs 32
8-2. Interface Pinout 33
9-1. MPU416 System LEDs 36
9-2. Interface Pinout 37
10-1. ETH24GX Port Status LEDs 40
10-2. Hardware DM4000 ETH24GX 41
11-1. ETH24GX H Series Port Status LEDs 44
11-2. Hardware DM4000 ETH24GX H Series 45
12-1. ETH12GX Port Status LEDs 48
12-2. Hardware DM4000 ETH12GX 49
13-1. ETH12GX+1x10GX Port Status LEDs 52
13-2. Hardware DM4000 ETH12GX+1x10GX 53
14-1. ETH2x10GX Port Status LEDs 56
14-2. Hardware DM4000 ETH2x10GX 57
15-1. ETH24GT Port Status LEDs ..... **??**
15-2. Hardware DM4000 ETH24GT 61
16-1. ETH48GT Port Status LEDs ..... **??**
16-2. Hardware DM4000 ETH48GT 65
17-1. ETH48GX H Series Port Status LEDs ..... **??**
17-2. Hardware DM4000 ETH48GX H Series 69
18-1. ETH24GX+2x10GX H Series Port Status LEDs 72
18-2. Hardware DM4000 ETH24GX+2x10GX H Series 73
19-1. ETH2x10GX H Series Port Status LEDs 76
19-2. Hardware DM4000 ETH2x10GX H Series 77
20-1. ETH4x10GX H Series Port Status LEDs 80
20-2. Hardware DM4000 ETH4x10GX H Series 81
21-1. Booster parameters 83

21-2. DM4000 GPC-OAB Port Status LEDs 83
22-1. Pre-amplifier parameters 85
22-2. DM4000 GPC-OAP Port Status LEDs 85
23-1. DCM parameters 87
25-1. Cable dimension according chassis 94
25-2. Gigabit SFP Modules 102
A-1. Cable DB9-RJ-45 104
C-1. Applicable Standards 107

Chapter 1. General Recommendation

1.1. Before the Installation

"Before the installation, read the entire manual attentively."

"The installation of any electric equipment must be in accordance with the current law in the place where this equipment will be installed. This includes adequate devices of protection, sizing and protection to the capacities of the equipment."

"Always observe the instructions of security during the installation, operation or maintenance of this product. Installation, adjustment or maintenance must be carried through only by qualified, trained and authorized people."

"The power supply, where the supply cable is connected, must be positioned near the equipment and be on an easily accessible location, because the equipment is turned on and off through it."

"Follow intently every guidance included in this manual. In case of doubts, please contact the authorized technical support."

"All slots that are not occupied with boards must be closed with a blank panel. Thus, you avoid the exposure to the energized parts inside the equipment. This procedure must be performed only by a trained and authorized person."

"When installing the equipment, always tighten screws and knurling screws until the end of their thread and until they are completely tightened."

"The described equipment in this manual is sensible to the static electricity. Before handling any equipment described in this manual, verify if the devices of protection against static electricity are functioning correctly."

"Some equipment in this manual have laser emitting optical modules. Avoid the exposure to eyes and skin."

"WEEE Directive Symbol (Applicable in the European Union and other European countries with separate collection systems).This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your consumer waste equipment for recycling, please contact your local city recycling office or the dealer from whom you originally purchased the product."

Chapter 2. Introduction

2.1. About this guide

This guide can be used for all DATACOM DM4000 Metro Ethernet Series, providing information about installation and characteristics of the DM4000 family.

This guide focuses on the physical, electrical, status indications and installation portion of the hardware. It is assumed that the individual or individuals managing any aspect of this product have basic understanding of Switching, Routing, Ethernet, and general Telecommunications.

2.2. Overview

Figure 2-1. DM4000 Series - DM4008(left), DM4004(right, below) and DM4001(right, above)

The DM4000 Metro Ethernet Switches offer the best and most reliable solution for Fast, Gigabit and 10 Gigabit Ethernet deployments. Supporting copper and fiber connections, DATACOM DM4000 switches

can be used to connect to clients, servers or access devices (hubs, routers, LAN switches or WAN access devices).

DM4000 Metro Ethernet Series provides multiple chassis options to connect and manage non-blocking data between boards. Its scalable platform design allows future growth and investment protection from the smallest to the largest chassis option.

The DM4000 Series provide several optional interface modules with all chassis sizes, and may be configured to support redundant MPUs (Main Processor Units), compatible with either the 6U (DM4004) and/or the 10U (DM4008) height chassis, following your network growth and guaranteeing advanced reliability for your network.

For complete management, CLI, Web, SNMP and DmView tools are available. The DmView tool is a Graphical User Interface that allows complete state and fail monitoring conditions, configuration management and inventory, perfect for higher network sizes.

DM4000 Series is the perfect choice for the core of your network, ensuring its reliability and scalability.

The Chassis models available are as follows:

- *DM4001 Chassis* - 19" 1U height Chassis compatible with all DM4000 interface modules.
- *DM4004 Chassis* - 19" and 23" 6U height Chassis with 4 interface slots, 2 MPU slots and a FAN slot.
- *DM4008 Chassis* - 19" 10U height Chassis with 8 interface slots, 2 MPU slots and a FAN slot.

Interface Modules available in DM4000 Series:

- *DM4000 ETH24GX* - Hot swappable 24 ports SFP Gigabit Ethernet switch interface board. SFPs are 1000Base-X and SGMII compatible.
- *DM4000 ETH24GX H Series* - Hot swappable 24 ports SFP Gigabit Ethernet switch interface board. SFPs are 100Base-FX, 1000Base-X and SGMII compatible.
- *DM4000 ETH12GX* - Hot swappable 12 ports SFP Gigabit Ethernet switch interface board. SFPs are 1000Base-X and SGMII compatible.
- *DM4000 ETH12GX+1x10GX* - Hot swappable 12 ports SFP Gigabit Ethernet switch plus one 10 Gigabit XFP interface board. SFPs are 1000Base-X and SGMII compatible.
- *DM4000 ETH24GX+2x10GX H Series* - Hot swappable 24 ports SFP Gigabit Ethernet switch plus two 10 Gigabit XFP interface board. SFPs are 100Base-FX, 1000Base-X and SGMII compatible.
- *DM4000 ETH2x10GX* - Hot swappable 2 ports 10 Gigabit XFP interface board.

- *DM4000 ETH2x10GX H Series* - Hot swappable 2 ports 10 Gigabit XFP interface board.
- *DM4000 ETH24GT* - Hot swappable 24 ports 10/100/1000Base-T Ethernet switch interface board.
- *DM4000 ETH48GT* - Hot swappable 48 ports 10/100/1000Base-T Ethernet switch interface board.
- *DM4000 ETH48GX H Series* - Hot swappable 48 ports SFP Gigabit Ethernet switch interface board. SFPs are 100Base-FX, 1000Base-X and SGMII compatible.
- *DM4000 ETH4x10GX H Series* - Hot swappable 4 ports 10 Gigabit XFP interface board.

MPUs (Main Processor Unit) available in DM4000 Series:

- *DM4000 MPU192* - Non-blocking, redundant and hot swappable Main Processor Unit, capable of switching 192Gbit/s of data.
- *DM4000 MPU384* - Non-blocking, redundant and hot swappable Main Processor Unit, capable of switching 384Gbit/s of data.
- *DM4000 MPU416* - Non-blocking, redundant and hot swappable Main Processor Unit, capable of switching 416Gbit/s of data.

FAN interfaces available in DM4000 Series:

- *DM4004 FAN* - Hot swappable FAN module for DM4004 Chassis 19".
- *DM4004 23" FAN* - Hot swappable FAN module for DM4004 Chassis 23".
- *DM4008 FAN* - Hot swappable FAN module for DM4008 Chassis.

GPC available in DM4000 Series:

- *DM4000 GPC-OAB* - Hot swappable optical booster amplifier.
- *DM4000 GPC-OAP* - Hot swappable optical pre-amplifier.
- *DM4000 GPC-DCM* - Hot swappable Dispersion Compensation Module.

Some combinations of Interface Boards and MPUs are unsupported due to the system internal architecture. These combinations are listed bellow:

- DM4000 ETH2x10GX using a MPU192 in a DM4008 Chassis
- DM4000 ETH24GX using a MPU192 in a DM4008 Chassis

- DM4000 ETH12GX+1x10GX using a MPU192 in a DM4008 Chassis

Different MPUs cannot be used in the same chassis. You must use both MPUs of the same type (two MPU192, MPU384 or MPU416)

Chapter 3. Technical Specifications

3.1. Environmental Conditions

Operating Temperature: 0 to 55 degrees Celsius

Storage Temperature: -20 to 65 degrees Celsius

Humidity: 10 to 90% non condensing

3.2. Power Supply

The DM4000 family has a DC power input range of -48 to -60 V

WARNING:

"Before connecting any cable to the equipment, be sure that the grounding system is functional."

WARNING:

"The power supply, where the supply cable is connected, must be positioned near the equipment and have easy access, because the equipment is turned on and off through it."

3.2.1. DM4001

Table 3-1. Recommended Power Limits and Consumption Parameters for DM4001

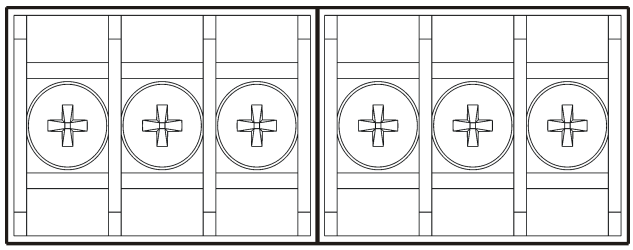
Rec. Voltage Limits		Power Type	Power max.	Current max.
min.	max.			
-48V	-60V	DC	200W	3.5A

Table 3-2. Absolute Power Limits for DM4001

Absolute Voltage Limits		Power Type	Power max.	Current max.
min.	max.			
-36V	-72V	DC	200W	4.7A

Follow Power information below screws to correct RET / -48V connections

Figure 3-1. DM4001 Power Supplies Connectors



3.2.2. DM4004

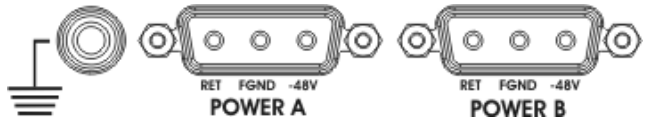
Table 3-3. Recommended Power Limits and Consumption Parameters for DM4004

Rec. Voltage Limits		Power Type	Power max.	Current max.
min.	max.			
-48V	-60V	DC	576W	12.00A

Table 3-4. Absolute Power Limits for DM4004

Absolute Voltage Limits		Power Type	Power max.	Current max.
min.	max.			
-36V	-72V	DC	576W	16.00A

Figure 3-2. DM4004 Power Supplies Connectors



3.2.3. DM4008

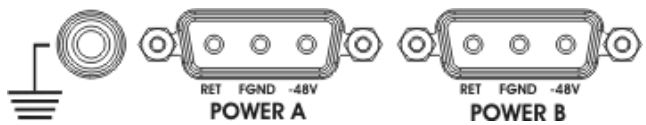
Table 3-5. Recommended Power Limits and Consumption Parameters for DM4008

Rec. Voltage Limits		Power Type	Power max.	Current max.
min.	max.			
-48V	-60V	DC	1200W	25.00A

Table 3-6. Absolute Power Limits for DM4008

Absolute Voltage Limits		Power Type	Power max.	Current max.
min.	max.			
-36V	-72V	DC	1200W	33.33A

Figure 3-3. DM4008 Power Supplies Connectors



3.2.4. Interface Modules

Table 3-7. Consumption and Fuse

Interface Module	Fuse	Consumption
ETH24GX	3.15A fuse, type T (delay), 250V	90W
ETH24GX H Series	3.15A fuse, type T (delay), 250V	70W
ETH12GX	3.15A fuse, type T (delay), 250V	45W
ETH12GX+1x10GX	3.15A fuse, type T (delay), 250V	80W
ETH24GX+2x10GX H Series	3.15A fuse, type T (delay), 250V	80W

Interface Module	Fuse	Consumption
ETH2x10GX	3.15A fuse, type T (delay), 250V	70W
ETH2x10GX H Series	3.15A fuse, type T (delay), 250V	70W
ETH24GT	3.15A fuse, type T (delay), 250V	55W
ETH48GT	3.15A fuse, type T (delay), 250V	110W
ETH48GX H Series	3.15A fuse, type T (delay), 250V	85W
ETH4x10GX H Series	3.15A fuse, type T (delay), 250V	70W
MPU192	3.15A fuse, type T (delay), 250V	20W
MPU384	3.15A fuse, type T (delay), 250V	30W
MPU416	3.15A fuse, type T (delay), 250V	30W
GPC-OAB	3.15A fuse, type T (delay), 250V	10W
GPC-OAP	3.15A fuse, type T (delay), 250V	10W
GPC-DCM	NA	NA
DM4001	3.15A fuse, type T (delay), 250V	22W
DM4004 FAN	3.15A fuse, type T (delay), 250V	30W
DM4004 23" FAN	3.15A fuse, type T (delay), 250V	30W
DM4008 FAN	3.15A fuse, type T (delay), 250V	100W

3.3. Dimensions

Height	240 mm (DM4004), 400mm (DM4008) and 44mm (DM4001)
Width w/o brackets	440mm in 19” chassis and 541.4mm in 23” chassis
Width with brackets	483mm in 19” chassis and 584.2mm in 23” chassis
Depth	280 mm (DM4004, DM4008 and DM4001)

3.4. Weight

Table 3-8. Chassis

Chassis	Kilograms (kg)	Pounds (lbs)
DM4001	2.86	6.29
DM4004 19"	8.21	18.09
DM4004 23"	10.10	22.26
DM4008	11.57	25.51

Table 3-9. FANs

FAN	Kilograms (kg)	Pounds (lbs)
DM4004 19"	1.49	3.28
DM4004 23"	1.31	2.89
DM4008	2.68	5.90

Table 3-10. MPUs

MPU	Kilograms (kg)	Pounds (lbs)
MPU192	0.97	2.13
MPU384	1.12	2.47
MPU416	1.12	2.47

Table 3-11. Interface Boards

Interface Board	Kilograms (kg)	Pounds (lbs)
ETH24GX	2.49	5.49
ETH24GX H Series	2.49	5.49
ETH12GX	2.30	5.07
ETH12GX+1x10GX	2.39	5.27
ETH24GX+2x10GX H Series	2.74	6.03
ETH2x10GX	2.35	5.17
ETH2x10GX H Series	2.35	5.17
ETH24GT	2.49	5.49
ETH48GT	2.78	6.12
ETH48GX H Series	2.91	6.42
ETH4x10GX H Series	2.52	5.54

Table 3-12. GPC Boards

GPC	Kilograms (kg)	Pounds (lbs)
GPC-OAB	0.41	0.90
GPC-OAP	0.41	0.90
GPC-DCM	0.41	0.90

Table 3-13. Blank Panels

Panel	Kilograms (kg)	Pounds (lbs)

Panel	Kilograms (kg)	Pounds (lbs)
Interface Boards Blank Panel	2.68	5.90
MPUs Blank Panel	0.09	0.19
GPCs Blank Panel	0.05	0.11

Chapter 4. DM4001 Chassis

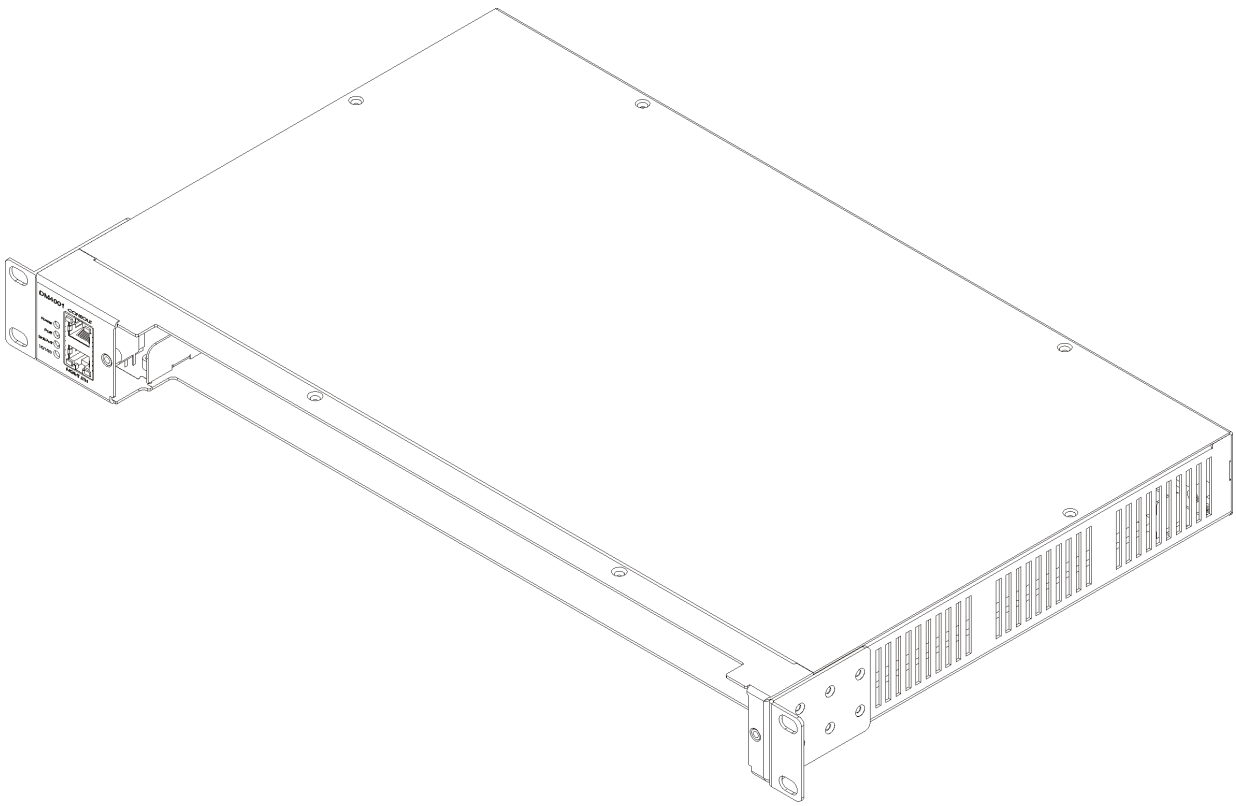
4.1. Overview

The DM4001 chassis is compatible with all interface boards of the DM4000 Series, allowing their utilization as a standalone version.

Its backplane interface allows non-blocking wire speed data of all interface boards connected.

Each interface board has temperature sensors that allow DM4001 chassis electronic fan control to manage fan speed increasing equipment reliability and minimizing fan noise.

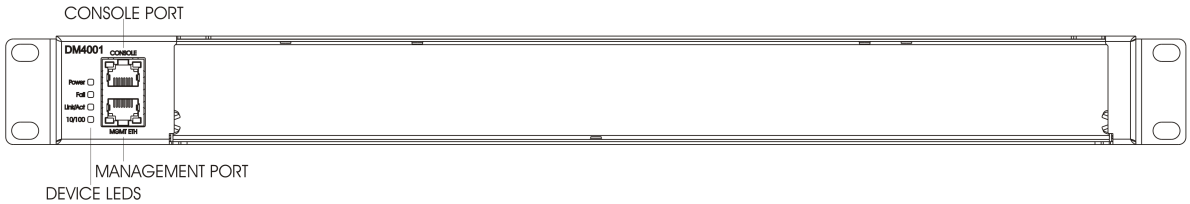
Figure 4-1. DM4001 Chassis



4.2. Front Panel Description

The Front Panel of the DM4001 chassis has a RS232 Console port, an Ethernet Outband Management interface and Status LEDs.

Figure 4-2. DM4001 Chassis - Front Panel



4.3. System Status LEDs

The System Status LEDs on the front panel can be used to monitor system activity. The following figure shows where the LEDs are located and the table below indicates the system status according to each LEDs condition.

Figure 4-3. DM4001 Chassis - Front Panel LEDs

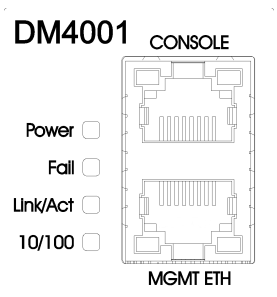


Table 4-1. System LEDs DM4001 Chassis

LED	CONDITION	STATUS
Power	ON	Equipment on.
	OFF	Equipment off.
Fail	ON	Indicates fail (high temperature or fan fail).
	OFF	Equipment operates normally.
Link/Act	ON/Blinking	Connected with link up. Blinking indicates activity.
	OFF	No connection established.
Speed	ON	10Mbit/s connection established.
	OFF	Indicates a 100Mbit/s Connection when Link/Act LED is ON or Blinking.

4.4. Console and Ethernet Outband Management Ports

The switch contains two RJ-45 connectors on its front panel. The upper connector is the Console port and the lower is the Outband Management port.

The Management port can be connected to a desktop through a CAT 5 Ethernet cable.

The pinouts of both Console and Outband Management ports are shown in the following figure and table.

Figure 4-4. Double RJ-45 Connector

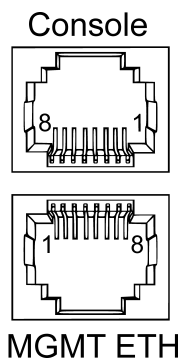


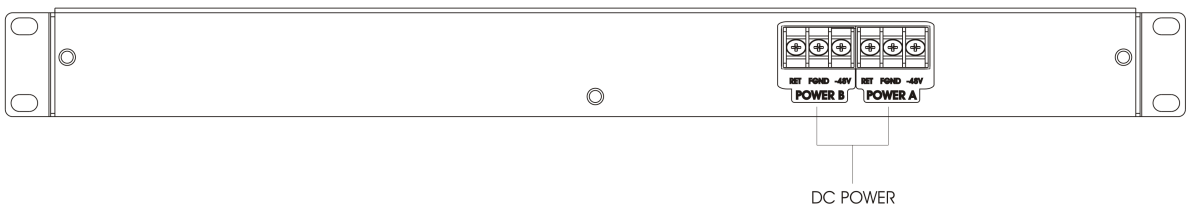
Table 4-2. Interface Pinout

Management Port	
RJ-45	*Signal*
1	Tx+
2	Tx-
3	Rx+
6	Rx-
4,5,7,8	-
RJ-45 Serial Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx

4.5. Rear Panel Description

The Rear Panel of the DM4001 chassis has two 48 to 60V DC power inputs.

Figure 4-5. DM4001 Rear Panel



Note: The figure above represents the last version of Rear Panel, another version could be different. For your safety read the power indication.

Chapter 5. DM4004 Chassis

5.1. Overview

The DM4004 chassis is compatible with all MPUs and interface boards of the DM4000 Series. It is available in two versions: for use in 19" and 23" racks. The 19" chassis is the standard version while the 23" has a better temperature perfomance and a dust filter option.

Both versions have a backplane that can handle up to 384Gbps of non-blocking data. They have four interface board slots, two MPU slots, two general purpose slots and one FAN module slot.

Figure 5-1. DM4004 Chassis 19"

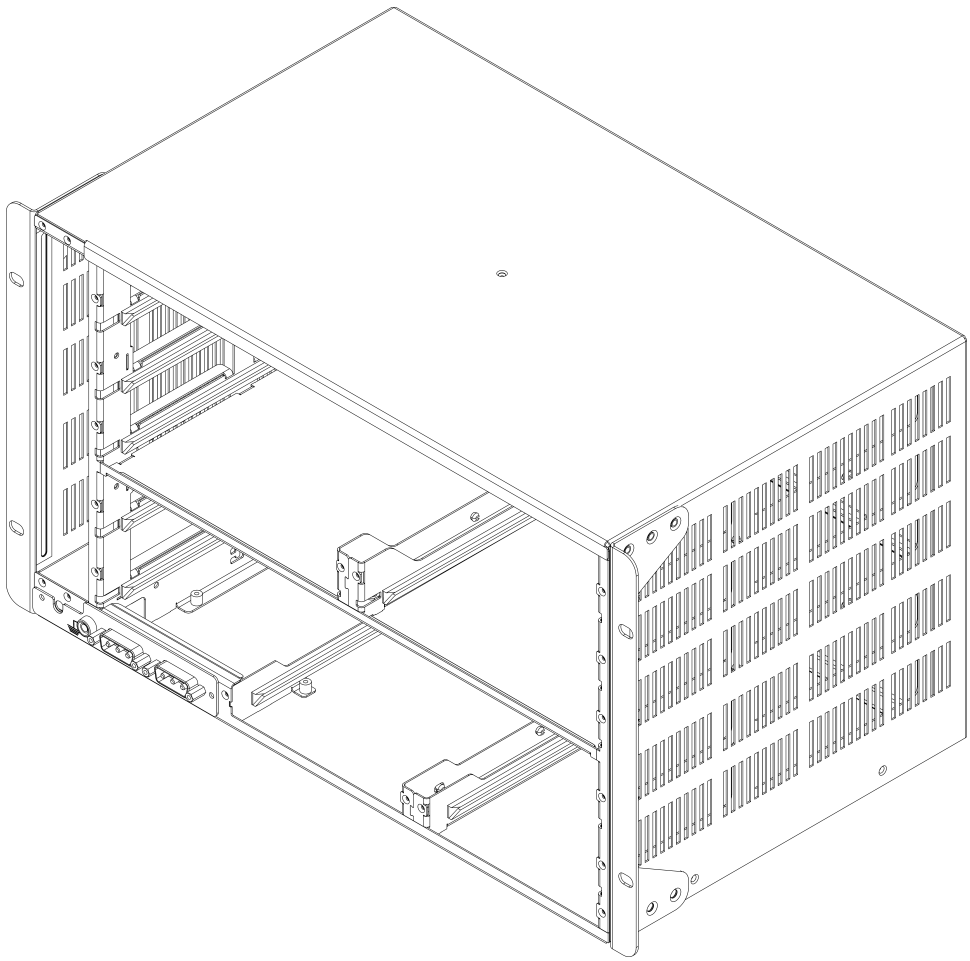
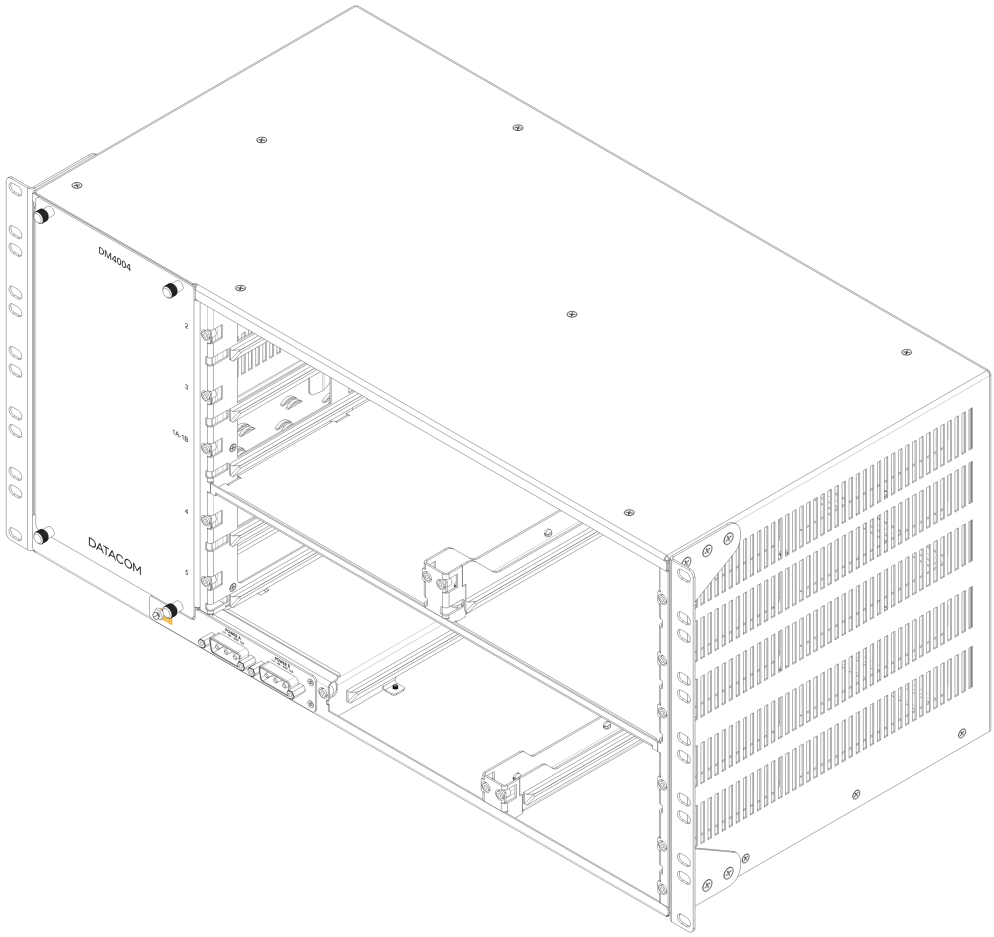


Figure 5-2. DM4004 Chassis 23"



For normal operation blank panels are required for non slotted interface boards and MPUs.

5.2. Front Panel Description

The main power input connectors are located in the Front Panel of DM4004 chassis. It supports dual redundant DC inputs for 48V DC nominal operation.

Figure 5-3. DM4004 Chassis 19" - Front Panel

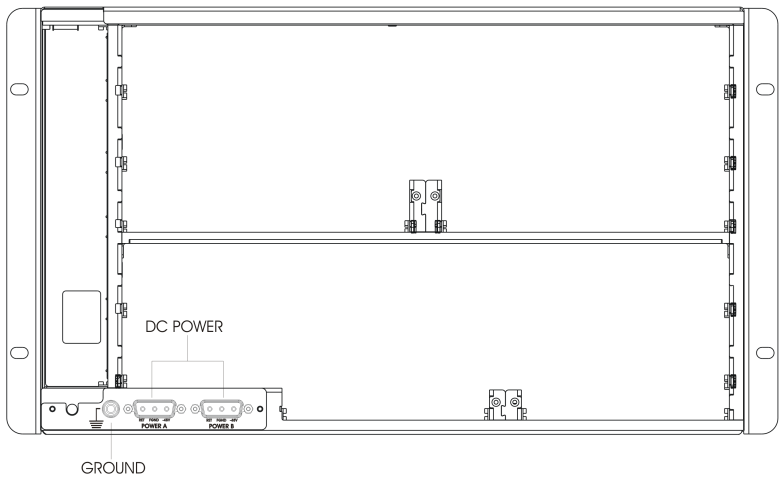
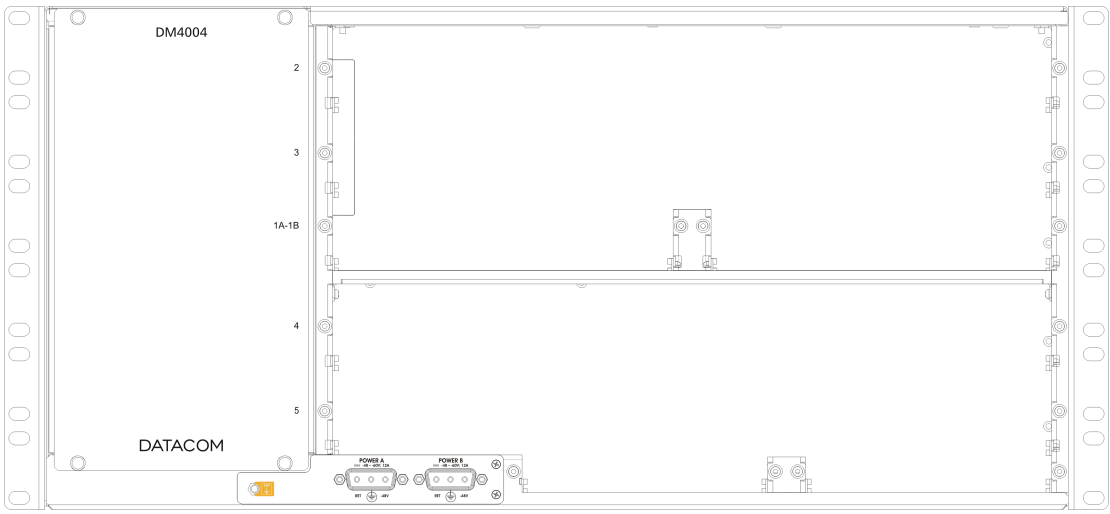


Figure 5-4. DM4004 Chassis 23" - Front Panel

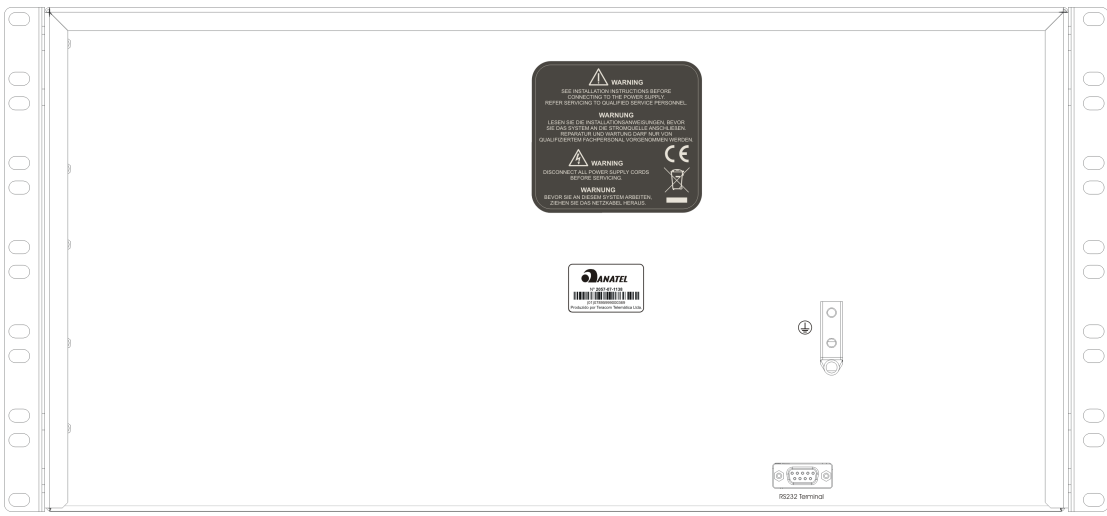


5.3. Rear Panel Description

The DM4004 chassis Rear Panel has one console DB9 connector.

Figure 5-5. DM4004 Chassis 19" - Rear Panel

Figure 5-6. DM4004 Chassis 23" - Rear Panel



5.4. Console Management Port

The chassis contains one DB9 connector on its rear panel. The connector has two Console ports, each one connected to each MPU.

The pinouts of the Console ports are shown in the following figure and table.

Figure 5-7. DB9 Pins Specification

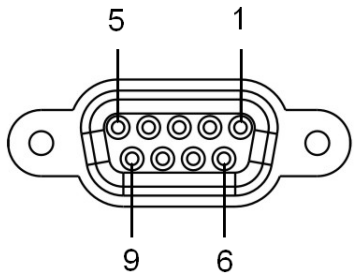


Table 5-1. DB9 Pins Specification

Pin	Signal
1,4,6,9	-
2	MPU-A TX
3	MPU-A RX
5	GND
7	MPU-B TX
8	MPU-B RX

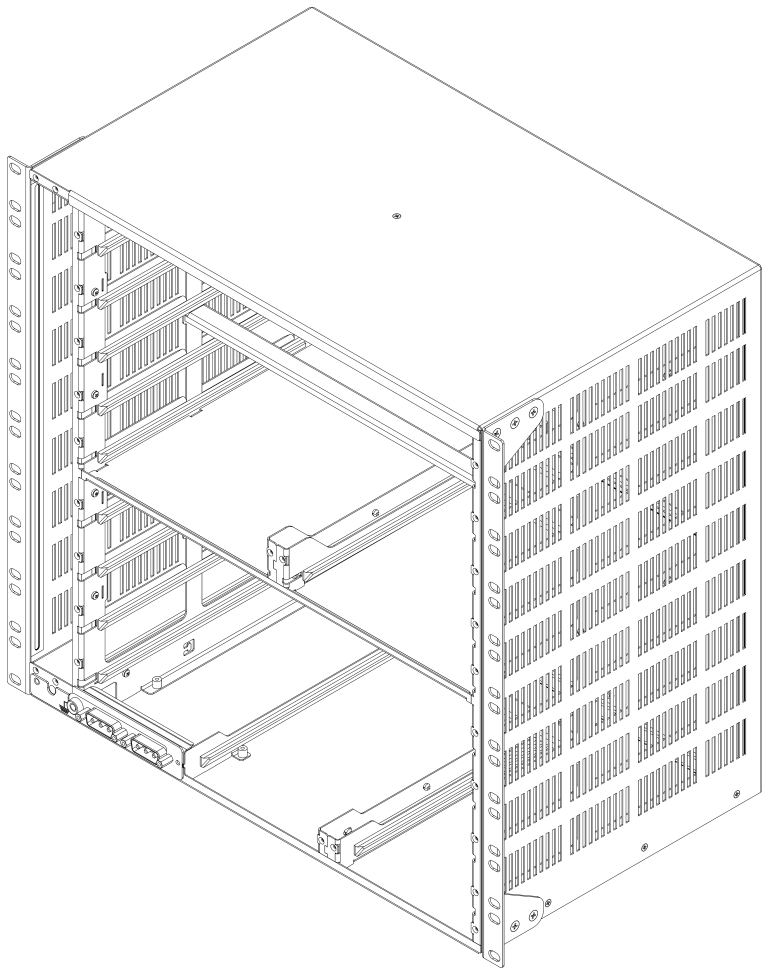
Chapter 6. DM4008 Chassis

6.1. Overview

The DM4008 chassis is compatible with all MPUs and interface boards of the DM4000 Series.

It has eight interface board slots, two MPU slots, two multipurpose slots and one FAN module slot.

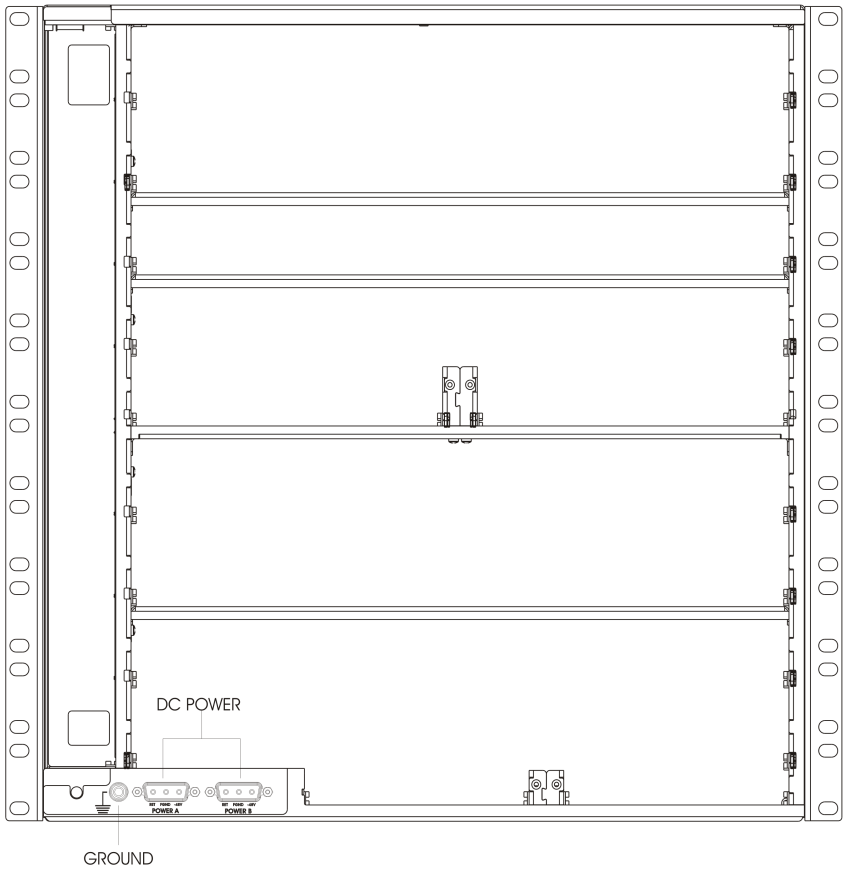
Figure 6-1. DM4008 Chassis



6.2. Front Panel Description

The main power input connectors are located in the Front Panel of DM4008 chassis. It supports dual redundant DC inputs for 48V DC nominal operation.

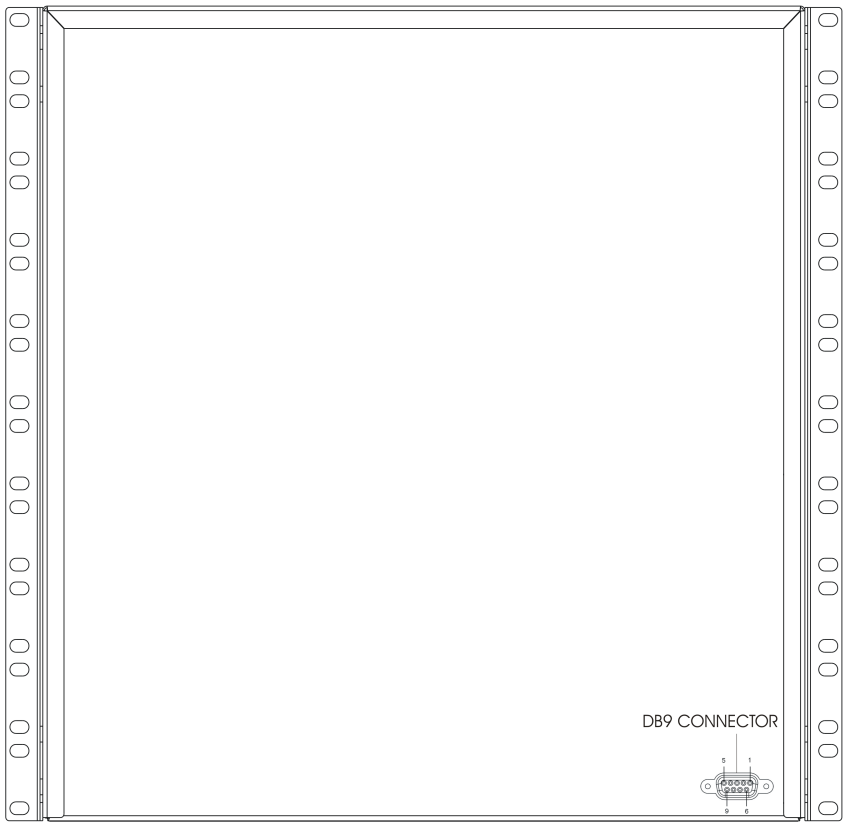
Figure 6-2. DM4008 Chassis - Front Panel



6.3. Rear Panel Description

The DM4008 chassis Rear Panel has one console DB9 connector.

Figure 6-3. DM4008 Chassis - Rear Panel



6.4. Console Management Port

The chassis contains one DB9 connector on its rear panel. The connector has two Console ports, each one connected to each MPU.

The pinouts of the Console ports are shown in the following figure and table.

Figure 6-4. DB9 Pins Specification

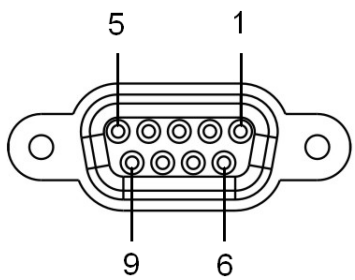


Table 6-1. DB9 Pins Specification

Pin	Signal
1,4,6,9	-
2	MPU-A TX
3	MPU-A RX
5	GND
7	MPU-B TX
8	MPU-B RX

Chapter 7. DM4000 MPU192

7.1. Overview

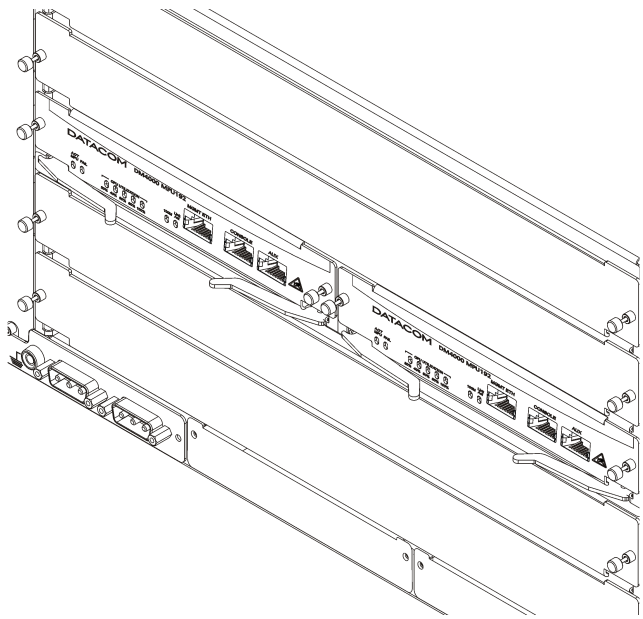
The DM4000 MPU192 is a hot-swappable Switch Fabric module capable of handling 192Gbps of non-blocking data (up to 96 Gigabit Ethernet ports). It is compatible with DM4004 and DM4008 chassis. In the DM4004 chassis it can handle up to 24 Gigabit ports per interface module at a non blocking configuration. In the DM4008 it can handle up to 12 Gigabit Ethernet ports per interface module board at a non-blocking configuration.

The entire 192Gbps data is switched by the active MPU, while the standby MPU monitors the state of the active MPU. In case of failure, the standby MPU assumes the switching of packets and generates a MPU failure major alarm to the management system.

The DM4000 MPU192 can handle up to 142,857,149 packets per second supporting 9kB jumbo frames and has an internal 1152kB Switching Memory reaching wire speed operation.

The DM4000 MPU192 has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

Figure 7-1. MPU192 inside DM4004 Chassis



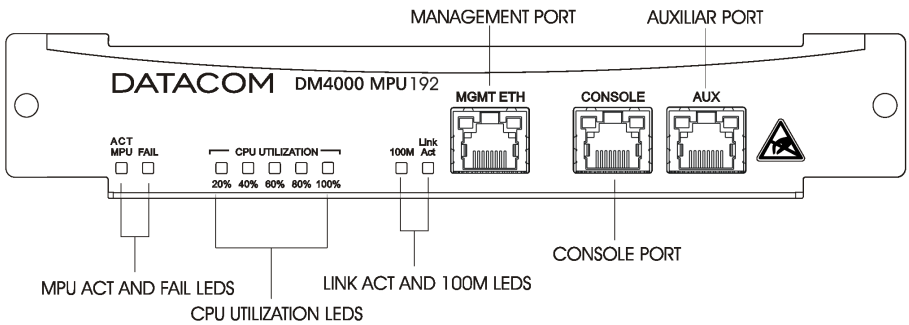
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

7.2. Front Panel Description

The DM4000 MPU192 Front Panel has system status LEDs, one Ethernet Outband Management port (MGMT ETH), one RS-232 Serial port (Console) and one Auxiliar port (AUX).

Figure 7-2. DM4000 MPU192 - Front Panel



WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"The interface board supports a 3.15 fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

7.3. System Status LEDs

The DM4000 MPU192 has 9 system status LEDs monitoring CPU utilization, Ethernet outband, system fails and active MPU status.

Figure 7-3. DM4000 MPU192 - Front Panel LEDs

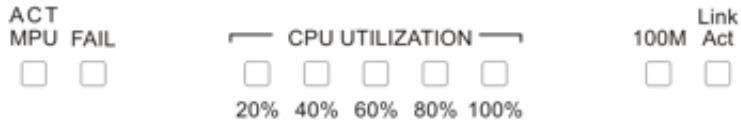


Table 7-1. MPU192 System LEDs

LED	CONDITION	STATUS
ACT MPU	ON	MPU active.
	OFF	MPU inactive.
FAIL	ON	Hardware failure.
	OFF	Hardware is functional.
CPU UTILIZATION	ON	20% utilization.
	ON	40% utilization.
	ON	60% utilization.
	ON	80% utilization.
	ON	100% utilization.
100 M	ON	Indicates a 100Mbps connection in MGMT port.
	OFF	When Link/Act is on or blinking, indicates that a 10Mbps connection is active in MGMT ETH port.
Link Act	ON/Blinking	Indicates a connection in MGMT ETH port.
	OFF	No connection in MGMT ETH port.

7.4. Console and Ethernet Outband Management Ports

The DM4000 MPU192 contains three RJ-45 connectors on its front panel: one Outband Management port, one Console port and one AUX console port.

The Outband Management interface can be connected to a desktop through a CAT 5 Ethernet cable.

The pinouts of both Console and Outband Management ports are shown in the table below.

Figure 7-4. DM4000 MPU192 - Front Panel Connectors

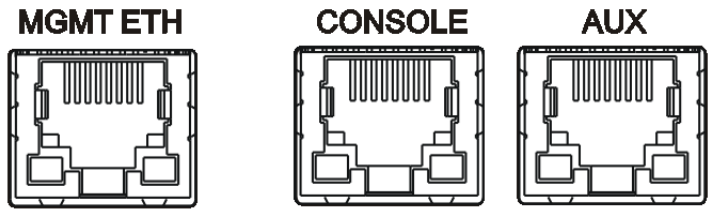


Table 7-2. Interface Pinout

Management Port	
Pin	*Signal*
1	Tx+
2	Tx-
3	Rx+
6	Rx-
4,5,7,8	-
Console Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx
AUX Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx

Chapter 8. DM4000 MPU384

8.1. Overview

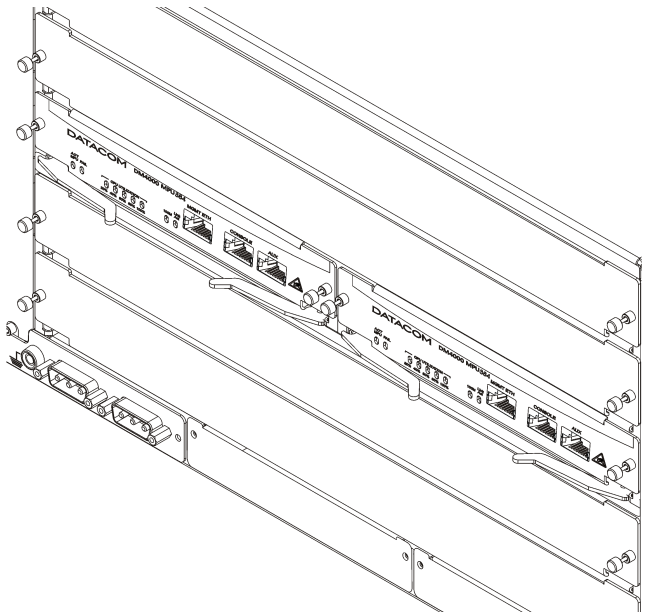
The DM4000 MPU384 is a hot-swappable Switch Fabric module capable of handling 384Gbps of non-blocking data (up to 192 Gigabit Ethernet ports). It is compatible with DM4004 and DM4008 chassis. In the DM4004 chassis it can handle up to 48 Gigabit Ethernet ports per interface board at a non-blocking configuration. In the DM4008 it can handle up to 24 Gigabit Ethernet ports per interface board.

The entire 384Gbps data is switched by the active MPU, while the standby MPU monitors the state of the active MPU. In case of failure, the standby MPU assumes the switching of packets and generates a MPU failure major alarm to the management system.

The DM4000 MPU384 can handle up to 285,714,285 packets per second supporting 12KB jumbo frames and has an internal 1.5MB Switching Memory reaching wire speed operation.

The DM4000 MPU384 has a 1GHz microprocessor with 2GB of RAM and 1GB of Flash.

Figure 8-1. MPU384 inside DM4004 Chassis



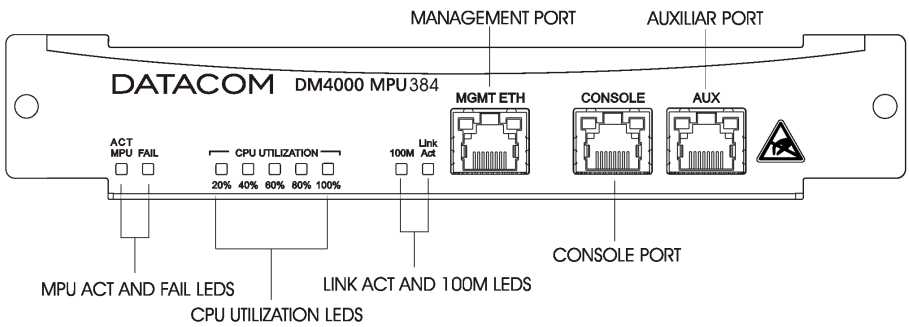
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

8.2. Front Panel Description

The DM4000 MPU384 Front Panel has system status LEDs, one Ethernet Outband Management port (MGMT ETH), one RS-232 Serial port (Console) and one Auxiliar port (AUX).

Figure 8-2. DM4000 MPU384 - Front Panel



WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"The interface board supports a 3.15 fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

8.3. System Status LEDs

The DM4000 MPU384 has 9 system status LEDs monitoring CPU utilization, Ethernet outband, system fails and active MPU status.

Figure 8-3. DM4000 MPU384 - Front Panel LEDs

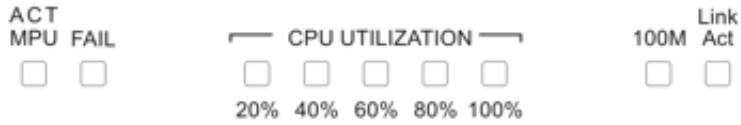


Table 8-1. MPU384 System LEDs

LED	CONDITION	STATUS
ACT MPU	ON	MPU active.
	OFF	MPU inactive.
FAIL	ON	Hardware failure.
	OFF	Hardware is functional.
CPU UTILIZATION	ON	20% utilization.
	ON	40% utilization.
	ON	60% utilization.
	ON	80% utilization.
	ON	100% utilization.
100 M	ON	Indicates a 100Mbps connection in MGMT port.
	OFF	When Link/Act is on or blinking, indicates that a 10Mbps connection is active in MGMT ETH port.
Link Act	ON/Blinking	Indicates a connection in MGMT ETH port.
	OFF	No connection in MGMT ETH port.

8.4. Console and Ethernet Outband Management Ports

The DM4000 MPU384 contains three RJ-45 connectors on its front panel: one Outband Management port, one Console port and one AUX console port.

The Outband Management interface can be connected to a desktop through a CAT 5 Ethernet cable.

The pinouts of both Console and Outband Management ports are shown in the table below.

Figure 8-4. DM4000 MPU384 - Front Panel Connectors

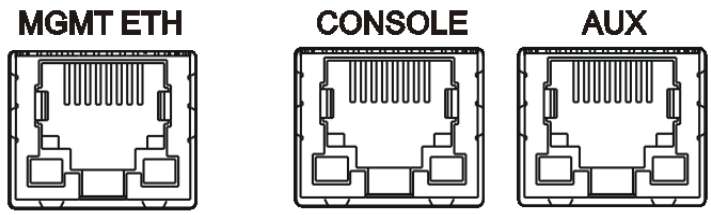


Table 8-2. Interface Pinout

Management Port	
Pin	*Signal*
1	Tx+
2	Tx-
3	Rx+
6	Rx-
4,5,7,8	-
Console Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx
AUX Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx

Chapter 9. DM4000 MPU416

9.1. Overview

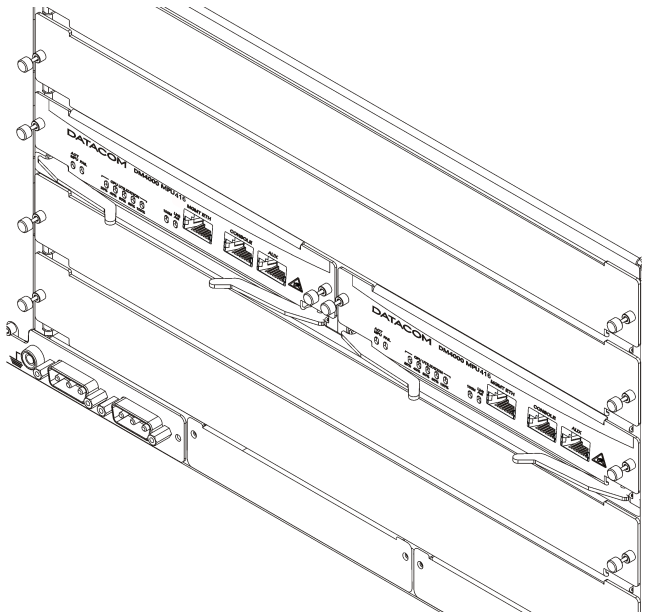
The DM4000 MPU416 is a hot-swappable Switch Fabric module capable of handling 416Gbps of non-blocking data (up to 208 Gigabit Ethernet ports). It is compatible with DM4004 and DM4008 chassis. In the DM4004 chassis it can handle up to 52 Gigabit Ethernet ports per interface board at a non-blocking configuration. In the DM4008 it can handle up to 26 Gigabit Ethernet ports per interface board.

The entire 416Gbps data is switched by the active MPU, while the standby MPU monitors the state of the active MPU. In case of failure, the standby MPU assumes the switching of packets and generates a MPU failure major alarm to the management system.

The DM4000 MPU416 can handle up to 309,523,808 packets per second supporting 12KB jumbo frames and has an internal 1.5MB Switching Memory reaching wire speed operation.

The DM4000 MPU416 has a 1GHz microprocessor with 2GB of RAM and 1GB of Flash.

Figure 9-1. MPU416 inside DM4004 Chassis



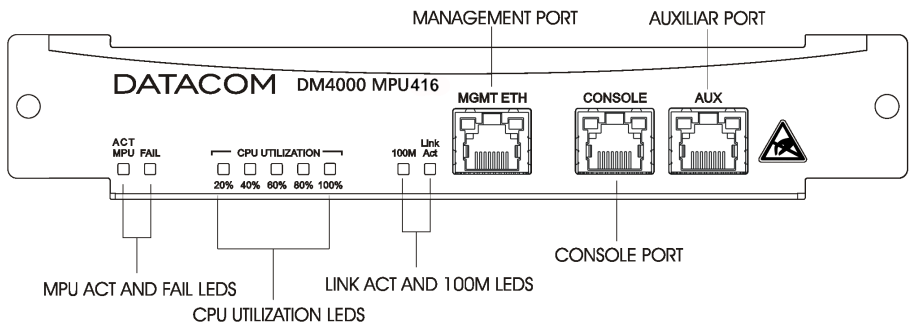
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

9.2. Front Panel Description

The DM4000 MPU416 Front Panel has system status LEDs, one Ethernet Outband Management port (MGMT ETH), one RS-232 Serial port (Console) and one Auxiliar port (AUX).

Figure 9-2. DM4000 MPU416 - Front Panel



WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"The interface board supports a 3.15 fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

9.3. System Status LEDs

The DM4000 MPU416 has 9 system status LEDs monitoring CPU utilization, Ethernet outband, system fails and active MPU status.

Figure 9-3. DM4000 MPU416 - Front Panel LEDs

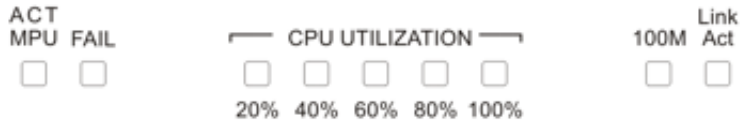


Table 9-1. MPU416 System LEDs

LED	CONDITION	STATUS
ACT MPU	ON	MPU active.
	OFF	MPU inactive.
FAIL	ON	Hardware failure.
	OFF	Hardware is functional.
CPU UTILIZATION	ON	20% utilization.
	ON	40% utilization.
	ON	60% utilization.
	ON	80% utilization.
	ON	100% utilization.
100 M	ON	Indicates a 100Mbps connection in MGMT port.
	OFF	When Link/Act is on or blinking, indicates that a 10Mbps connection is active in MGMT ETH port.
Link Act	ON/Blinking	Indicates a connection in MGMT ETH port.
	OFF	No connection in MGMT ETH port.

9.4. Console and Ethernet Outband Management Ports

The DM4000 MPU416 contains three RJ-45 connectors on its front panel: one Outband Management port, one Console port and one AUX console port.

The Outband Management interface can be connected to a desktop through a CAT 5 Ethernet cable.

The pinouts of both Console and Outband Management ports are shown in the table below.

Figure 9-4. DM4000 MPU416 - Front Panel Connectors

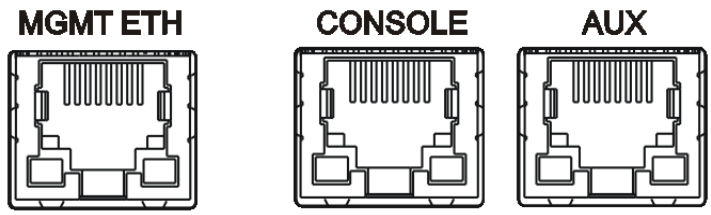


Table 9-2. Interface Pinout

Management Port	
Pin	*Signal*
1	Tx+
2	Tx-
3	Rx+
6	Rx-
4,5,7,8	-
Console Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx
AUX Port	
1,2,7,8	-
3	Tx
4,5	GND
6	Rx

Chapter 10. DM4000 ETH24GX

10.1. Overview

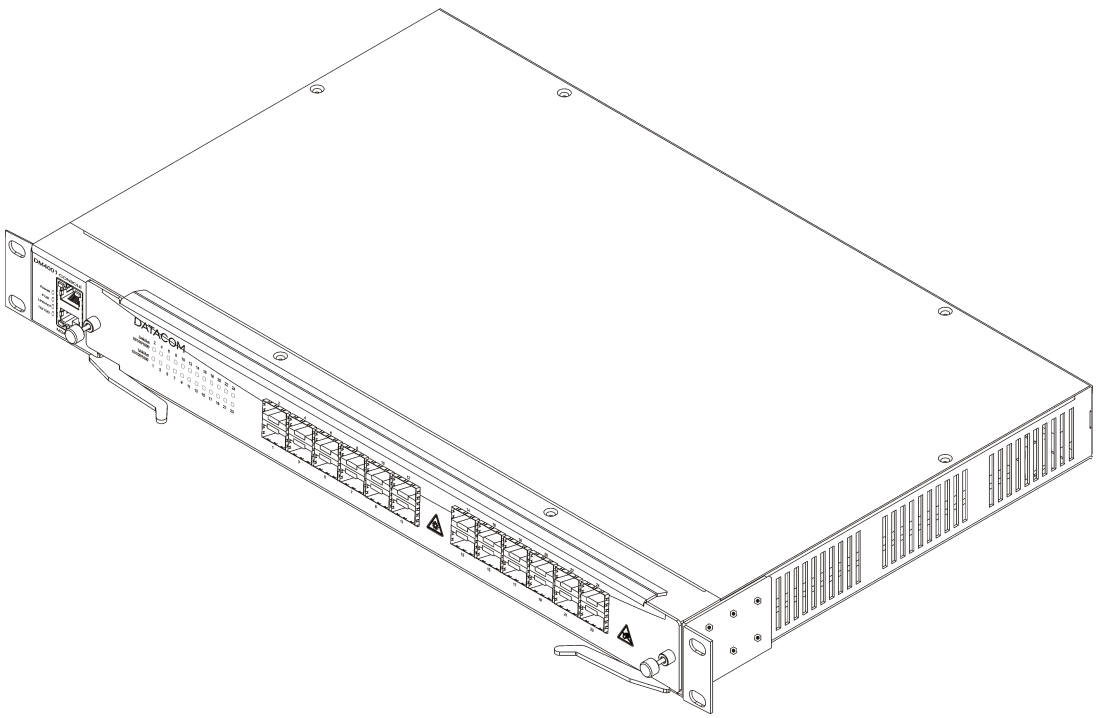
The DM4000 ETH24GX is a non-blocking 24 SFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH24GX can handle up to 35,714,285 packets per second supporting 9600 bytes jumbo frames and has an internal 256MB Switching Memory supporting wire speed operation.

The DM4000 ETH24GX has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

The DM4000 ETH24GX extensive Metro support can handle up to 1,024,000 MACs and larger L3 tables.

Figure 10-1. DM4000 ETH24GX inside DM4001 Chassis



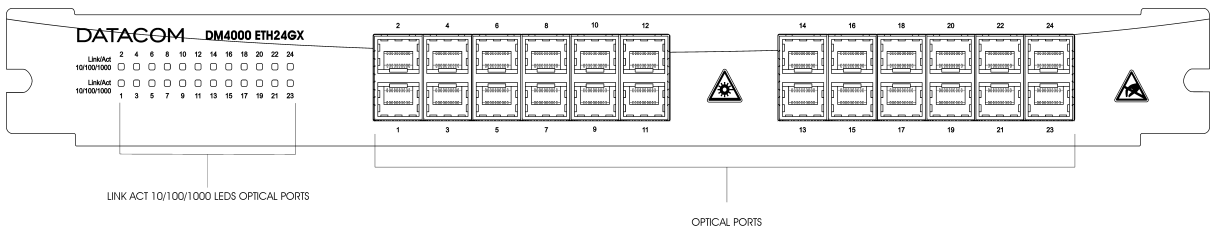
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

10.2. Front Panel Description

DM4000 ETH24GX front panel contains 24 SFP slots and port status LEDs.

Figure 10-2. DM4000 ETH24GX - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

10.3. System Status LEDs

The DM4000 ETH24GX has the following port status LEDs.

Figure 10-3. DM4000 ETH24GX - Front Panel LEDs

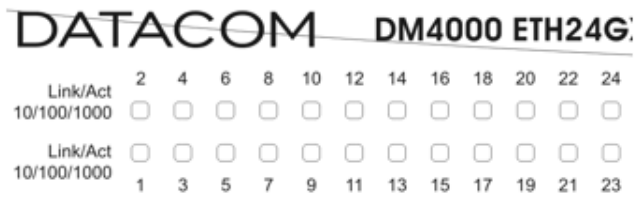


Table 10-1. ETH24GX Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	Orange	Indicates that a 10/100Mbps connection was established.
	Green	Indicates that a 1000Mbps connection was established.

10.4. Software and Hardware Features

10.4.1. Software

Software information is available in a separated guide.

10.4.2. Hardware

Table 10-2. Hardware DM4000 ETH24GX

Feature	Description
Switch L2	Wire Speed
Router 3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
PoE	N/A
Ports	24 x 1000Base-X (SFP)
Packet Buffer	128MB
Switch Fabric (intern)	48Gbps
Flash	64MB
SDRAM	256MB
MAC address table	1024k*
L3 hosts (IPv4)	32k*
L3 hosts (IPv6)	16k*
L3 Routes (IPv4)	240k*
L3 Routes (IPv6)	240k*
L2 Multicast groups	1k
L3 Multicast groups (Ipv4)	4k
L3 Multicast groups (IPv6)	1k
Filters	4k
Meters	4k
Counters	4k

Important: *maximum value - Actual values vary lower due to resource sharing

Chapter 11. DM4000 ETH24GX H Series

11.1. Overview

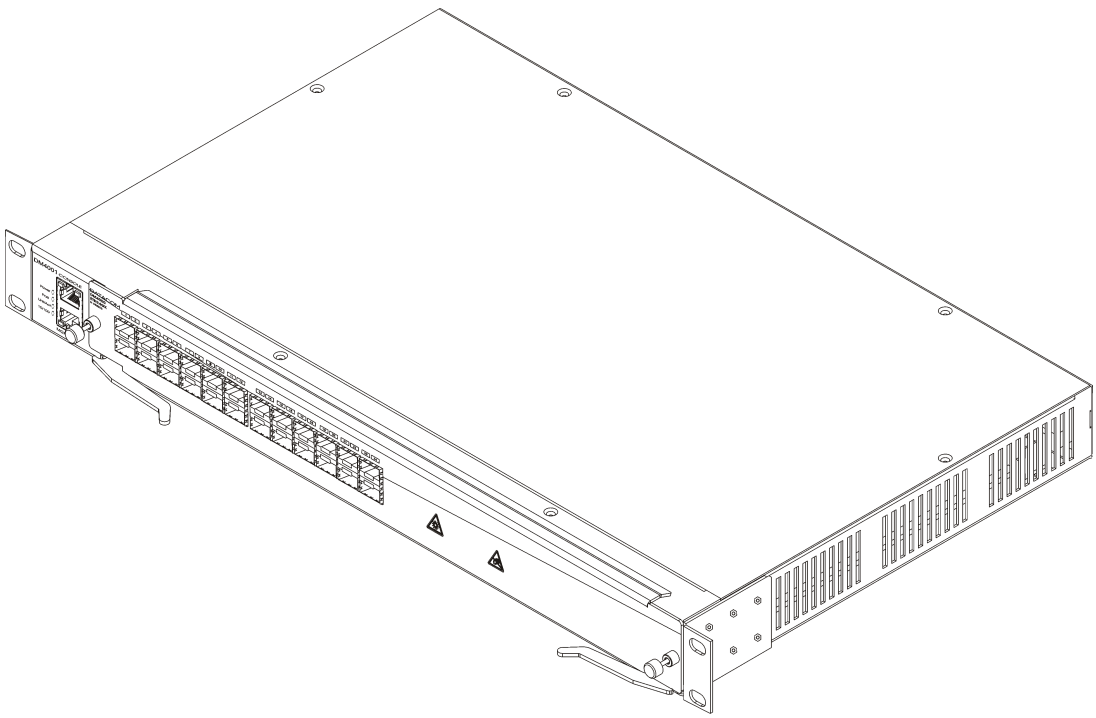
The DM4000 ETH24GX H Series is a non-blocking 24 SFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH24GX H Series can handle up to 35,714,285 packets per second supporting 12K jumbo frames and has an internal 4MB Switching Memory supporting wire speed operation.

The DM4000 ETH24GX H Series has a 1GHz microprocessor with 1GB of RAM and 1GB of Flash.

The DM4000 ETH24GX H Series extensive Metro support can handle up to 524,288 MACs and larger L3 tables.

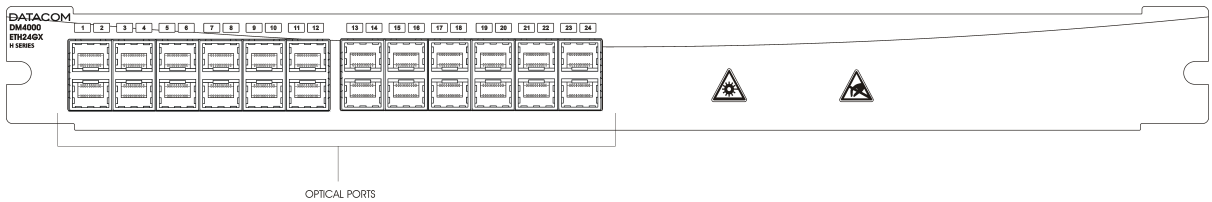
Figure 11-1. DM4000 ETH24GX H Series inside DM4001 Chassis



11.2. Front Panel Description

DM4000 ETH24GX H Series front panel contains 24 SFP slots and port status LEDs.

Figure 11-2. DM4000 ETH24GX H Series - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 5A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

11.3. System Status LEDs

The DM4000 ETH24GX H Series has the following port status LEDs.

Table 11-1. ETH24GX H Series Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	ON	Indicates that a 10/100Mbps connection was established.
	OFF	Indicates that a 1000Mbps connection was established.

11.4. Software and Hardware Features

11.4.1. Software

Software information is available in a separated guide.

11.4.2. Hardware

Table 11-2. Hardware DM4000 ETH24GX H Series

Feature	Description
Switch L2	Wire Speed
Router L3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
VPLS	VPN Emulated LAN
VPWS	VPN Point-to-Point
PoE	N/A
Ports	24 SFP**
Packet Buffer	4MB
Switch Fabric (intern)	48Gbps
Flash	1GB
RAM	1GB
MAC address table	512k*
L3 hosts (IPv4)	16k*
L3 hosts (IPv6)	8k*
L3 Routes (IPv4)	512k*
L3 Routes (IPv6 - 64b)	512k*
L3 Routes (IPv6 - 128b)	256k*
L2 Multicast groups	1k*
L3 Multicast groups (Ipv4)	4k*
L3 Multicast groups (IPv6)	256*
Filters	256k*
Meters	2k*
Counters	2k*

Important: *maximum value - Actual values vary lower due to resource sharing

**SFP ports can be 100Base-FX, 1000Base-X or SGMII

Chapter 12. DM4000 ETH12GX

12.1. Overview

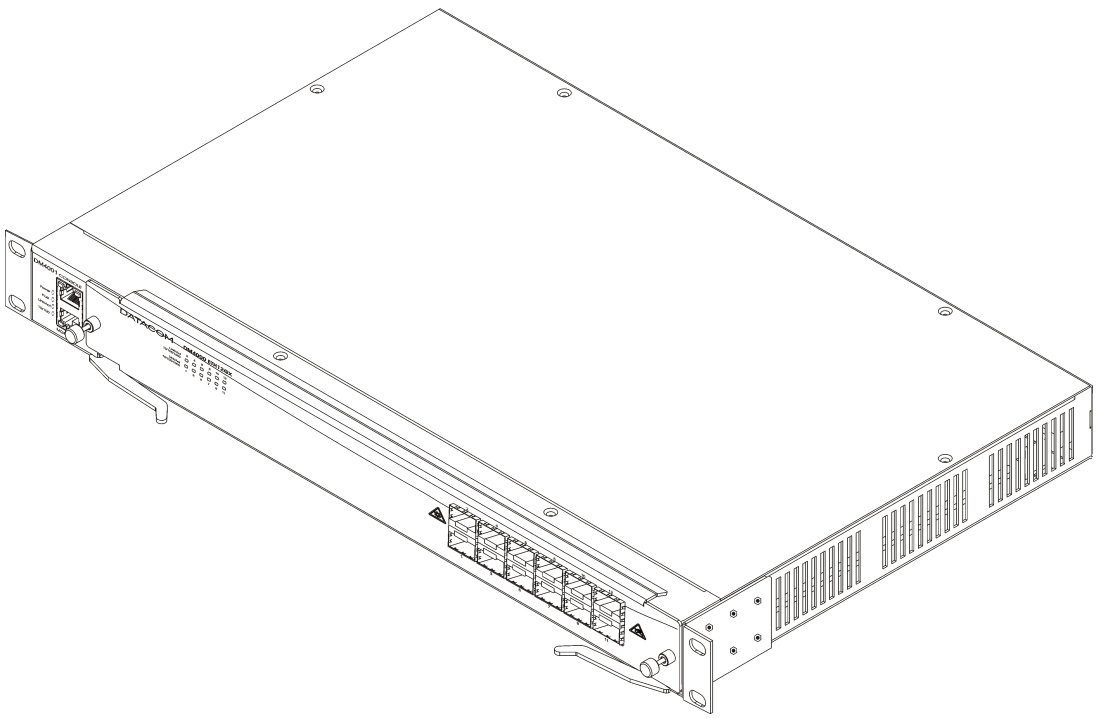
The DM4000 ETH12GX is a non-blocking 12 SFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH12GX can handle up to 17,857,142 packets per second supporting 9600 bytes jumbo frames and has an internal 128MB Switching Memory supporting wire speed operation.

The DM4000 ETH12GX has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

The DM4000 ETH12GX extensive Metro support can handle up to 512,000 MACs and larger L3 tables.

Figure 12-1. DM4000 ETH12GX inside DM4001 Chassis



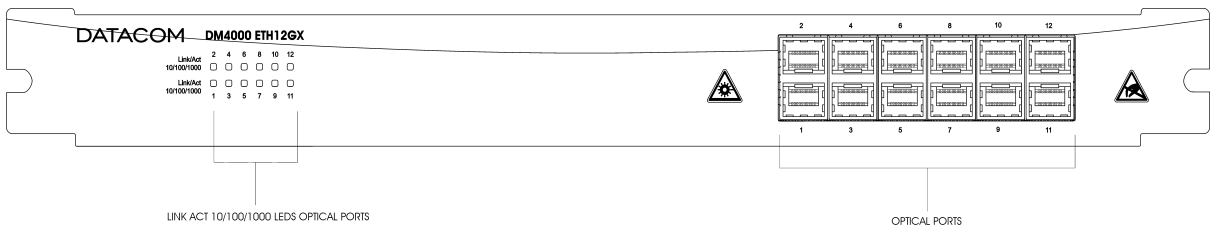
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

12.2. Front Panel Description

DM4000 ETH12GX front panel contains 12 SFP ports and port status LEDs.

Figure 12-2. DM4000 ETH12GX - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

12.3. System Status LEDs

The DM4000 ETH12GX has the following port status LEDs.

Figure 12-3. DM4000 ETH12GX - Front Panel LEDs

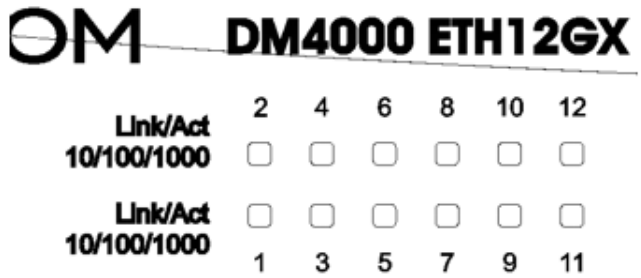


Table 12-1. ETH12GX Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	Orange	Indicates that a 10/100Mbps connection was established.
	Green	Indicates that a 1000Mbps connection was established.

12.4. Software and Hardware Features

12.4.1. Software

Software information is available in a separated guide.

12.4.2. Hardware

Table 12-2. Hardware DM4000 ETH12GX

Feature	Description
Switch L2	Wire Speed
Router 3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
PoE	N/A
Ports	12 x 1000Base-X (SFP)
Packet Buffer	128MB
Switch Fabric (intern)	24Gbps
Flash	64MB
SDRAM	256MB
MAC address table	512k*
L3 hosts (IPv4)	32k*
L3 hosts (IPv6)	16k*
L3 Routes (IPv4)	240k*
L3 Routes (IPv6)	240k*
L2 Multicast groups	1k
L3 Multicast groups (Ipv4)	4k
L3 Multicast groups (IPv6)	1k
Filters	4k
Meters	4k
Counters	4k

Important: *maximum value - Actual values vary lower due to resource sharing

Chapter 13. DM4000 ETH12GX+1x10GX

13.1. Overview

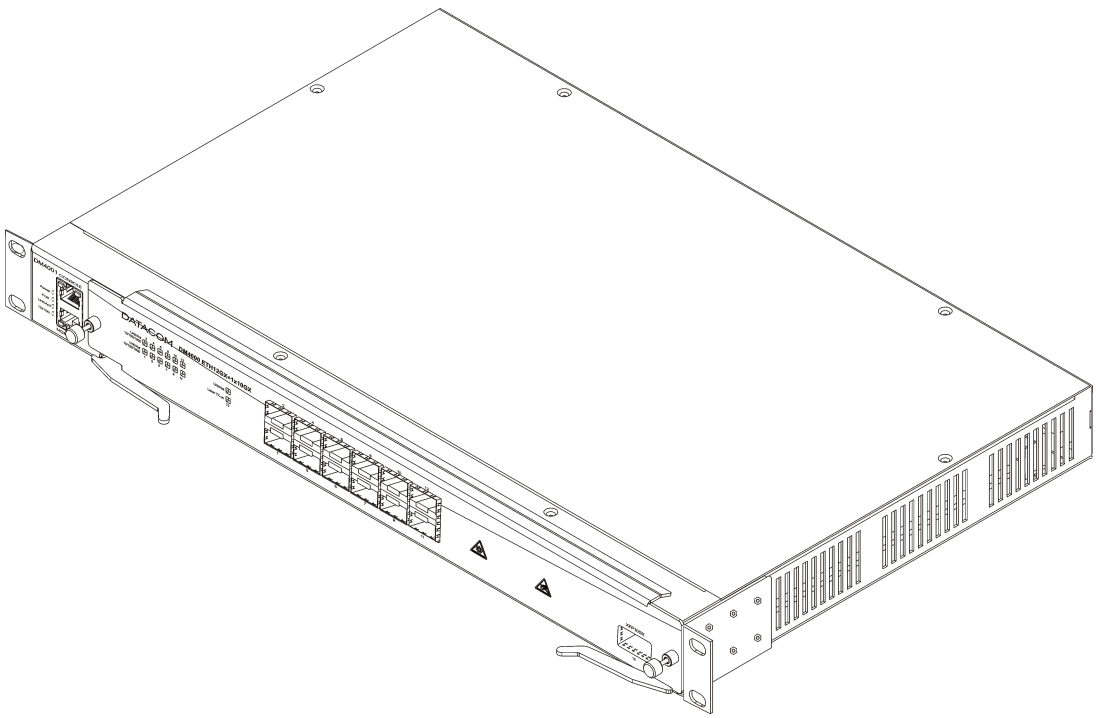
The DM4000 ETH12GX+1x10GX is a non-blocking 12 SFP port plus one 10 Gigabit XFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH12GX+1x10GX can handle up to 32,738,095 packets per second supporting 9600 bytes jumbo frames and has an internal 256MB Switching Memory supporting wire speed operation.

The DM4000 ETH12GX+1x10GX has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

The DM4000 ETH12GX+1x10GX extensive Metro support can handle up to 1,024,000 MACs and larger L3 tables.

Figure 13-1. DM4000 ETH12GX+1x10GX inside DM4001 Chassis



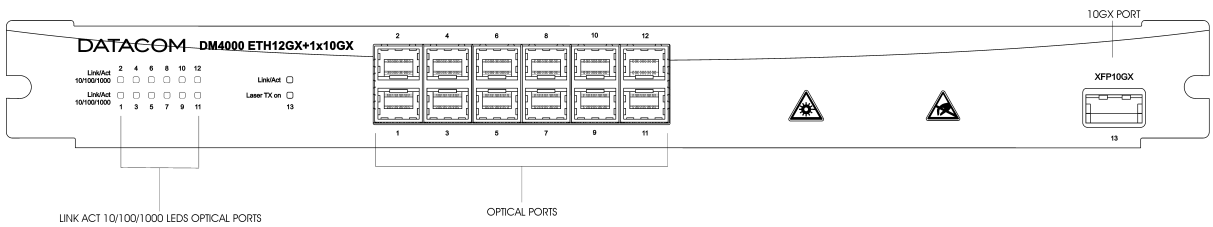
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

13.2. Front Panel Description

DM4000 ETH12GX+1x10GX front panel contains 12 SFP ports, 1 XFP port and port status LEDs.

Figure 13-2. DM4000 ETH12GX+1x10GX - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

13.3. System Status LEDs

The DM4000 ETH12GX+1x10GX has the following port status LEDs.

Figure 13-3. DM4000 ETH12GX+1x10GX - Front Panel LEDs

Table 13-1. ETH12GX+1x10GX Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	ON	Indicates that a 10/100Mbps connection was established.
	OFF	Indicates that a 1000Mbps connection was established.
Laser TX On	ON	Indicates that XFP TX laser is on.
	OFF	Indicates that XFP TX laser is off.

13.4. Software and Hardware Features

13.4.1. Software

Software information is available in a separated guide.

13.4.2. Hardware

Table 13-2. Hardware DM4000 ETH12GX+1x10GX

Feature	Description
Switch L2	Wire Speed
Router 3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
PoE	N/A
Ports	12 x 1000Base-X (SFP) + 1 x 10G (XFP)
Packet Buffer	128MB
Switch Fabric (intern)	44Gbps
Flash	64MB
SDRAM	256MB
MAC address table	1024k*
L3 hosts (IPv4)	32k*
L3 hosts (IPv6)	16k*
L3 Routes (IPv4)	240k*
L3 Routes (IPv6)	240k*
L2 Multicast groups	1k
L3 Multicast groups (Ipv4)	4k
L3 Multicast groups (IPv6)	1k
Filters	4k
Meters	4k
Counters	4k

Important: *maximum value - Actual values vary lower due to resource sharing

Chapter 14. DM4000 ETH2x10GX

14.1. Overview

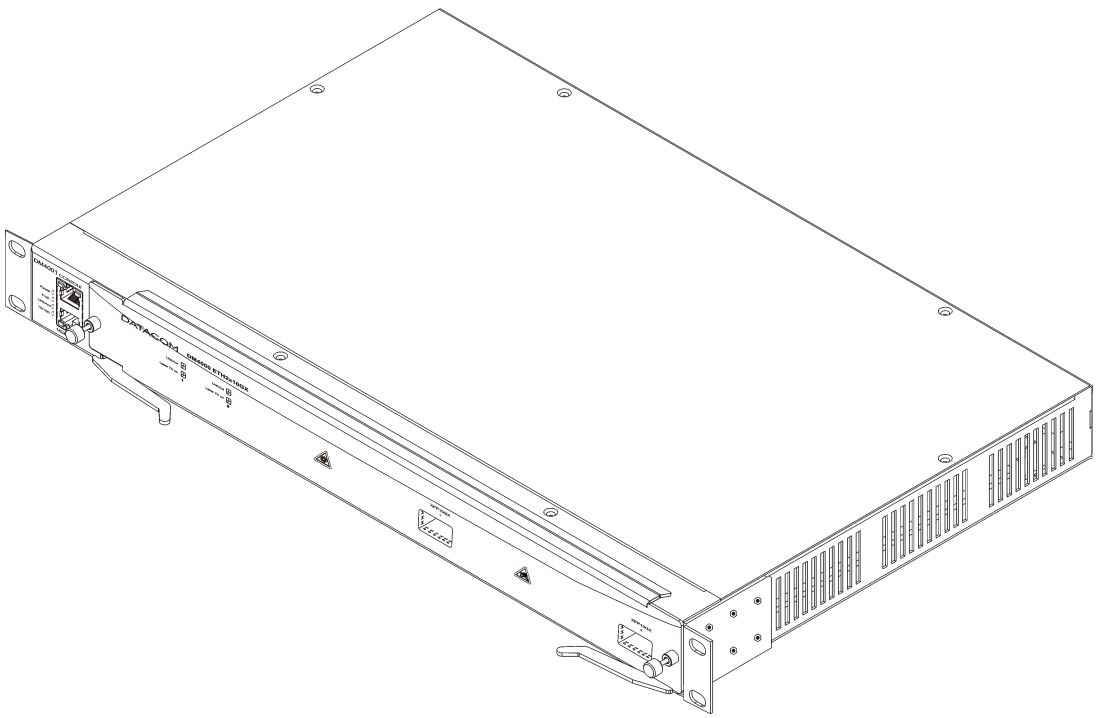
The DM4000 ETH2x10GX is a non-blocking two 10 Gigabit XFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH2x10GX can handle up to 29,761,904 packets per second supporting 9600 bytes jumbo frames and has an internal 256MB Switching Memory supporting wire speed operation.

The DM4000 ETH2x10GX has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

The DM4000 ETH2x10GX extensive Metro support can handle up to 1,024,000 MACs and larger L3 tables.

Figure 14-1. DM4000 ETH2x10GX inside DM4001 Chassis



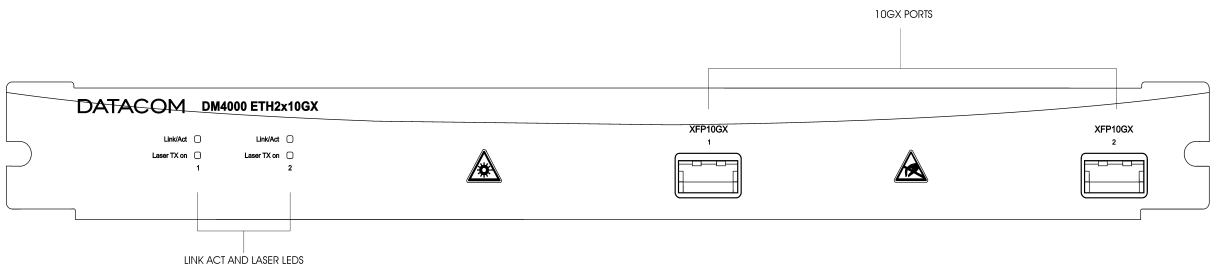
CAUTION:

"Risk of explosion if battery is replaced by an incorrect type. Use only cell type CR2032. Dispose of used batteries according with local regulations."

14.2. Front Panel Description

DM4000 ETH2x10GX front panel contains 2 XFP ports and port status LEDs.

Figure 14-2. DM4000 ETH2x10GX - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

14.3. System Status LEDs

The DM4000 ETH2x10GX has the following port status LEDs.

Figure 14-3. DM4000 ETH2x10GX - Front Panel LEDs

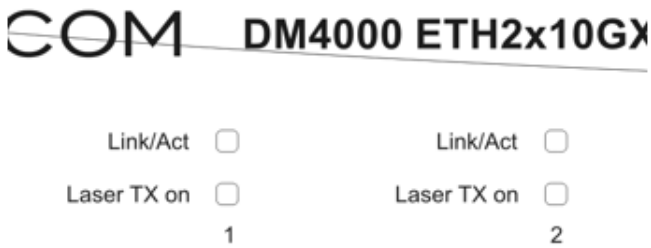


Table 14-1. ETH2x10GX Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
Laser TX On	ON	Indicates that XFP TX laser is on.
	OFF	Indicates that XFP TX laser is off.

14.4. Software and Hardware Features

14.4.1. Software

Software information is available in a separated guide.

14.4.2. Hardware

Table 14-2. Hardware DM4000 ETH2x10GX

Feature	Description
Switch L2	Wire Speed
Router 3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
PoE	N/A
Ports	2 x 10G (XFP)
Packet Buffer	128MB
Switch Fabric (intern)	40 Gbps
Flash	64MB
SDRAM	256MB
MAC address table	1024k*
L3 hosts (IPv4)	32k*
L3 hosts (IPv6)	16k*
L3 Routes (IPv4)	240k*
L3 Routes (IPv6)	240k*
L2 Multicast groups	1k
L3 Multicast groups (Ipv4)	4k
L3 Multicast groups (IPv6)	1k
Filters	4k
Meters	4k
Counters	4k

Important: *maximum value - Actual values vary lower due to resource sharing

Chapter 15. DM4000 ETH24GT

15.1. Overview

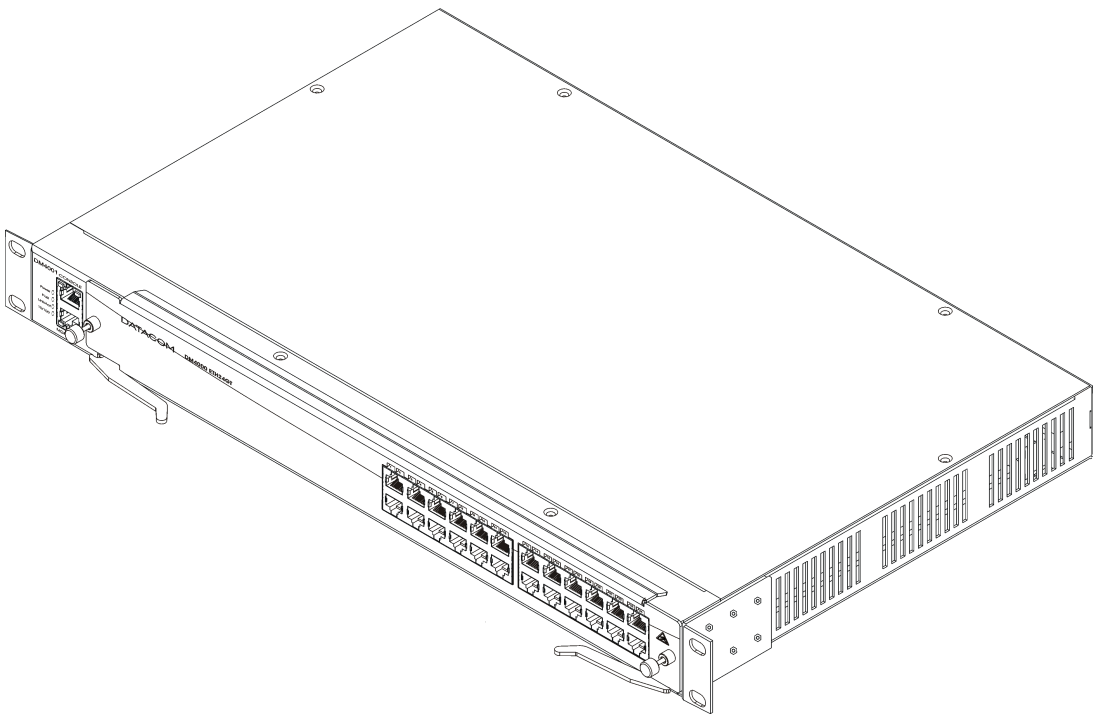
The DM4000 ETH24GT is a non-blocking 24 10/100/1000Mbps port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH24GT can handle up to 35,714,285 packets per second supporting 9500 bytes jumbo frames reaching wire speed operation.

The DM4000 ETH24GT has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

The DM4000 ETH24GT extensive Metro support can handle up to 16,000 MACs.

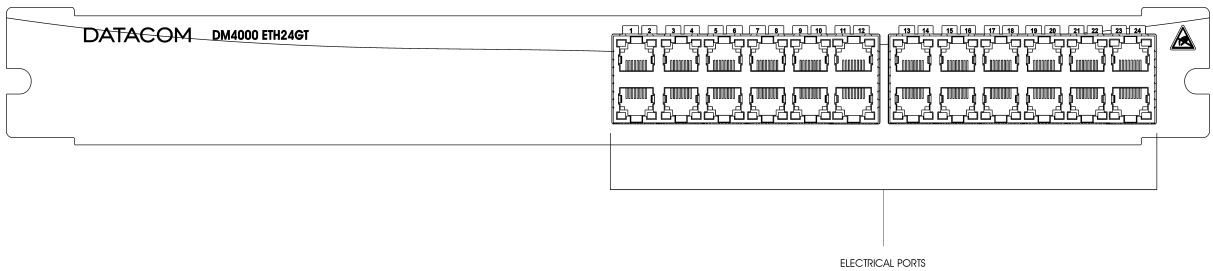
Figure 15-1. DM4000 ETH24GT inside DM4001 Chassis



15.2. Front Panel Description

The ETH24GT front panel contains 24 RJ45 ports and port status LEDs. With option to have PoE in all ports.

Figure 15-2. DM4000 ETH24GT - Front Panel



WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

15.3. System Status LEDs

The DM4000 ETH24GT has the following port status LEDs:

Table 15-1. ETH24GT Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	Orange	Indicates that a 10/100Mbps connection was established.
	Green	Indicates that a 1000Mbps connection was established.

15.4. Software and Hardware Features

15.4.1. Software

Software information is available in a separated guide.

15.4.2. Hardware

Table 15-2. Hardware DM4000 ETH24GT

Feature	Description
Switch L2	Wire Speed
Router 3	Wire Speed
QoS	L2-L4
MPLS	N/A
PoE	N/A
Ports	24 x 10/100/1000 Base-TX
Packet Buffer	2MB
Switch Fabric (intern)	48Gbps
Flash	64MB
SDRAM	256MB
MAC address table	16k
L3 hosts (IPv4)	8k
L3 hosts (IPv6)	4k
L3 Routes (IPv4)	12k
L3 Routes (IPv6)	6k
L2 Multicast groups	1k
L3 Multicast groups (Ipv4)	2k
L3 Multicast groups (IPv6)	512
Filters	4k
Meters	2k
Counters	2k

For operation with PoE: the voltage of power supply must be between 44-57V.

Chapter 16. DM4000 ETH48GT

16.1. Overview

The DM4000 ETH48GT is a non-blocking 48 10/100/1000Mbps port interface board compatible with DM4001, DM4004 and DM4008 chassis.

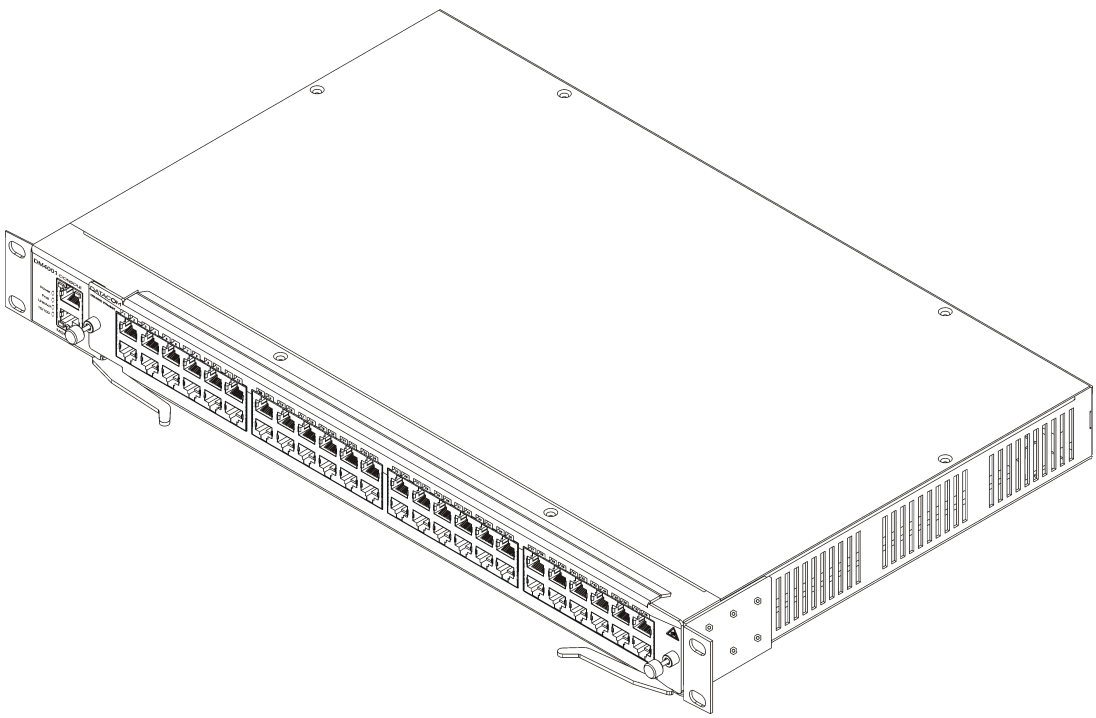
The DM4000 ETH48GT can handle up to 71,428,571 packets per second supporting 9500 bytes jumbo frames reaching wire speed operation.

The DM4000 ETH48GT has a 400MHz microprocessor with 256MB of RAM and 64MB of Flash.

The DM4000 ETH48GT extensive Metro support can handle up to 16,000 MACs.

This interface board reaches wire-speed operation in DM4001 chassis and with MPU384 in a DM4004 Chassis.

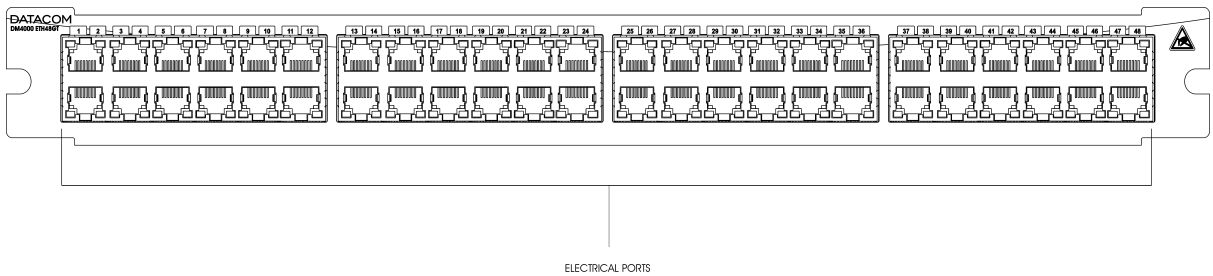
Figure 16-1. DM4000 ETH48GT inside DM4001 Chassis



16.2. Front Panel Description

The ETH48GT front panel contains 48 RJ45 ports and port status LEDs. With option to have PoE in all ports.

Figure 16-2. DM4000 ETH48GT- Front Panel



WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

16.3. System Status LEDs

The DM4000 ETH48GT has the following port status LEDs:

Table 16-1. ETH48GT Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	Orange	Indicates that a 10/100Mbps connection was established.
	Green	Indicates that a 1000Mbps connection was established.

16.4. Software and Hardware Features

16.4.1. Software

Software information is available in a separated guide.

16.4.2. Hardware

Table 16-2. Hardware DM4000 ETH48GT

Feature	Description
Switch L2	Wire Speed
Router 3	Wire Speed
QoS	L2-L4
MPLS	N/A
PoE	N/A
Ports	48 x 10/100/1000 Base-TX
Packet Buffer	2MB
Switch Fabric (intern)	96Gbps
Flash	64MB
SDRAM	256MB
MAC address table	16k
L3 hosts (IPv4)	8k
L3 hosts (IPv6)	4k
L3 Routes (IPv4)	12k
L3 Routes (IPv6)	6k
L2 Multicast groups	1k
L3 Multicast groups (Ipv4)	2k
L3 Multicast groups (IPv6)	512
Filters	4k
Meters	2k
Counters	2k

Chapter 17. DM4000 ETH48GX H Series

17.1. Overview

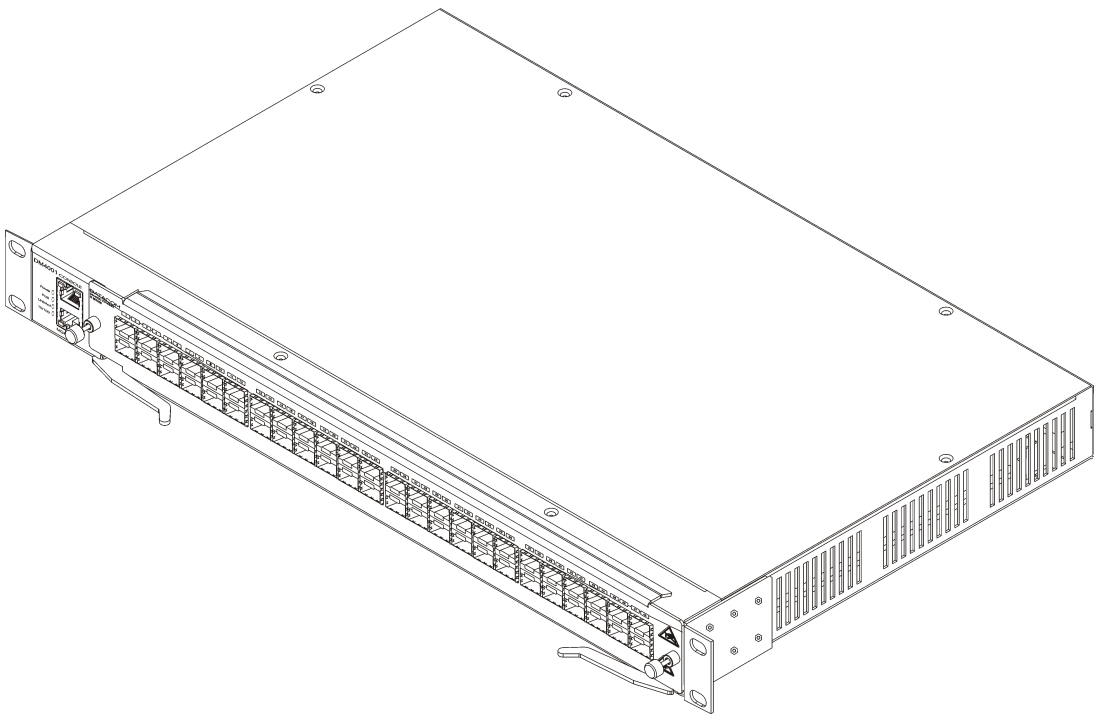
The DM4000 ETH48GX H Series is a non-blocking 48 SFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH84GX H Series can handle up to 71,428,571 packets per second supporting 12KB jumbo frames and has an internal 4MB Switching Memory supporting wire speed operation.

The DM4000 ETH48GX H Series has a 1GHz microprocessor with 1GB of RAM and 1GB of Flash.

The DM4000 ETH48GX H Series extensive Metro support can handle up to 524,288 MACs.

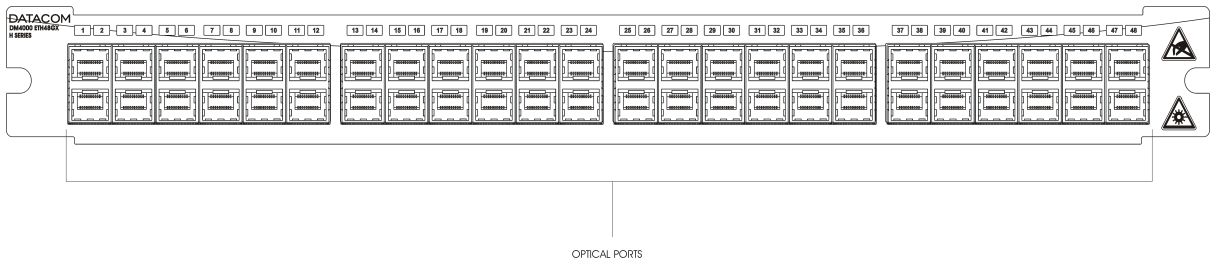
Figure 17-1. DM4000 ETH48GX H Series inside DM4001 Chassis



17.2. Front Panel Description

DM4000 ETH48GX H Series front panel contains 48 SFP slots and port status LEDs.

Figure 17-2. DM4000 ETH48GX H Series - Front Panel



WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on equipment."

WARNING:

"This interface board supports a 5A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value."

17.3. System Status LEDs

The DM4000 ETH48GX H Series has the following port status LEDs:

Table 17-1. ETH48GX H Series Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	Orange	Indicates that a 10/100Mbps connection was established.
	Green	Indicates that a 1000Mbps connection was established.

17.4. Software and Hardware Features

17.4.1. Software

Software information is available in a separated guide.

17.4.2. Hardware

Table 17-2. Hardware DM4000 ETH48GX H Series

Feature	Description
Switch L2	Wire Speed
Router L3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
VPLS	VPN Emulated LAN
VPWS	VPN Point-to-Point
PoE	N/A
Ports	48 x SFP**
Packet Buffer	4MB
Switch Fabric (intern)	96Gbps
Flash	1GB
RAM	1GB
MAC address table	512k*
L3 hosts (IPv4)	16k*
L3 hosts (IPv6)	8k*
L3 Routes (IPv4)	512k*
L3 Routes (IPv6 - 64b)	512k*
L3 Routes (IPv6 - 128b)	256k*
L2 Multicast groups	1k*
L3 Multicast groups (Ipv4)	4k*
L3 Multicast groups (IPv6)	256*
Filters	256k*
Meters	2k*
Counters	2k*

Important: *maximum value - Actual values vary lower due to resource sharing

**SFP ports can be 100Base-FX, 1000Base-X or SGMII

Chapter 18. DM4000 ETH24GX+2x10GX H Series

18.1. Overview

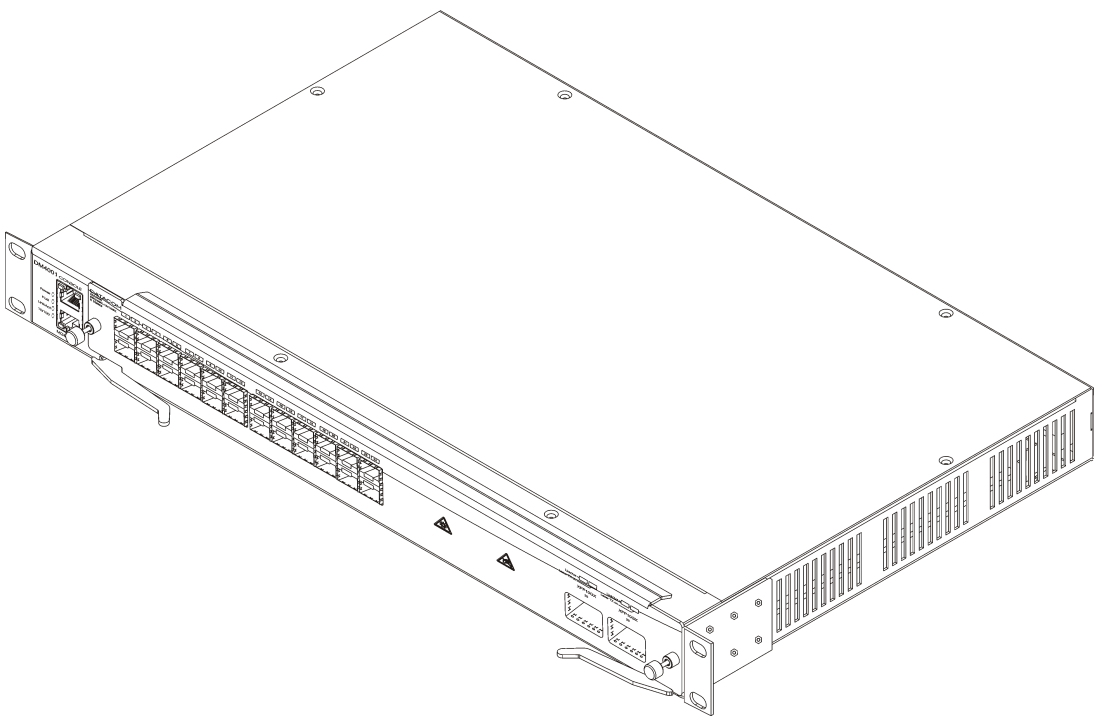
The DM4000 ETH24GX+2x10GX H Series is a non-blocking 24 SFP port plus two 10 Gigabit XFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH24GX+2x10GX H Series can handle up to 65,476,190 packets per second supporting 12KB jumbo frames and has an internal 4MB Switching Memory supporting wire speed operation.

The DM4000 ETH24GX+2x10GX H Series has a 1GHz microprocessor with 1GB of RAM and 1GB of Flash.

The DM4000 ETH24GX+2x10GX H Series extensive Metro support can handle up to 524,288 MACs and larger L3 tables.

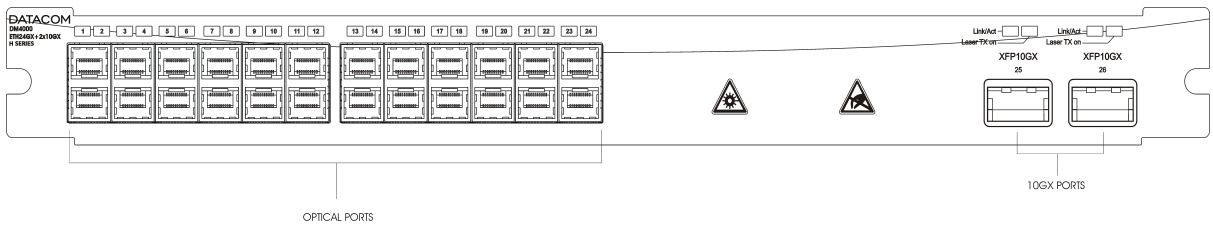
Figure 18-1. DM4000 ETH24GX+2x10GX H Series inside DM4001 Chassis



18.2. Front Panel Description

DM4000 ETH24GX+2x10GX front panel contains 24 SFP ports, 2 XFPs port and port status LEDs.

Figure 18-2. DM4000 ETH24GX+2x10GX H Series - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 5A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

18.3. System Status LEDs

The DM4000 ETH24GX+2x10GX H Series has the following port status LEDs.

Table 18-1. ETH24GX+2x10GX H Series Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	ON	Indicates that a 10/100Mbps connection was established.
	OFF	Indicates that a 1000Mbps connection was established.
Laser TX On	ON	Indicates that XFP TX laser is on.
	OFF	Indicates that XFP TX laser is off.

18.4. Software and Hardware Features

18.4.1. Software

Software information is available in a separated guide.

18.4.2. Hardware

Table 18-2. Hardware DM4000 ETH24GX+2x10GX H Series

Feature	Description
Switch L2	Wire Speed
Router L3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
VPLS	VPN Emulated LAN
VPWS	VPN Point-to-Point
PoE	N/A
Ports	24 x SFP** + 2 x 10G (XFP)
Packet Buffer	4MB
Switch Fabric (intern)	88Gbps
Flash	1GB
RAM	1GB
MAC address table	512k*
L3 hosts (IPv4)	16k*
L3 hosts (IPv6)	8k*
L3 Routes (IPv4)	512k*
L3 Routes (IPv6 - 64b)	512k*
L3 Routes (IPv6 - 128b)	256k*
L2 Multicast groups	1k*
L3 Multicast groups (Ipv4)	4k*
L3 Multicast groups (IPv6)	256*
Filters	256k*
Meters	2k*
Counters	2k*

Important: *maximum value - Actual values vary lower due to resource sharing

**SFP ports can be 100Base-FX, 1000Base-X or SGMII

Chapter 19. DM4000 ETH2x10GX H Series

19.1. Overview

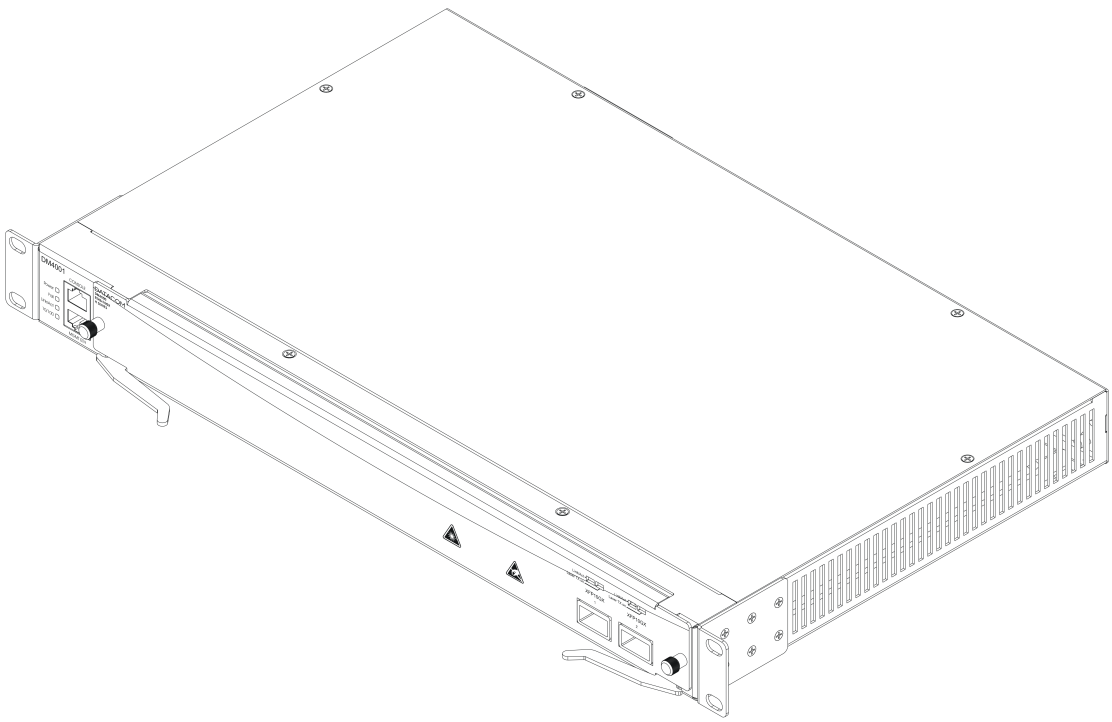
The DM4000 ETH2x10GX H Series is a non-blocking two 10 Gigabit XFP port interface board compatible with DM4001, DM4004 and DM4008 chassis.

The DM4000 ETH2x10GX H Series can handle up to 29,761,904 packets per second supporting 12KB jumbo frames and has an internal 4MB Switching Memory supporting wire speed operation.

The DM4000 ETH2x10GX H Series has a 1GHz microprocessor with 1GB of RAM and 1GB of Flash.

The DM4000 ETH2x10GX H Series extensive Metro support can handle up to 524,288 MACs and larger L3 tables.

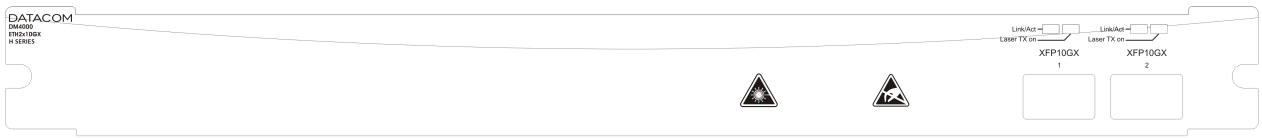
Figure 19-1. DM4000 ETH2x10GX H Series inside DM4001 Chassis



19.2. Front Panel Description

DM4000 ETH2x10GX front panel contains 2 XFPs port and port status LEDs.

Figure 19-2. DM4000 ETH2x10GX H Series - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

19.3. System Status LEDs

The DM4000 ETH2x10GX H Series has the following port status LEDs.

Table 19-1. ETH2x10GX H Series Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
Laser TX On	ON	Indicates that XFP TX laser is on.
	OFF	Indicates that XFP TX laser is off.

19.4. Software and Hardware Features

19.4.1. Software

Software information is available in a separated guide.

19.4.2. Hardware

Table 19-2. Hardware DM4000 ETH2x10GX H Series

Feature	Description
Switch L2	Wire Speed
Router L3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
VPLS	VPN Emulated LAN
VPWS	VPN Point-to-Point
PoE	N/A
Ports	24 x 1000Base-X (SFP) + 2 x 10G (XFP)
Packet Buffer	4MB
Switch Fabric (intern)	88Gbps
Flash	1GB
RAM	1GB
MAC address table	512k*
L3 hosts (IPv4)	16k*
L3 hosts (IPv6)	8k*
L3 Routes (IPv4)	512k*
L3 Routes (IPv6 - 64b)	512k*
L3 Routes (IPv6 - 128b)	256k*
L2 Multicast groups	1k*
L3 Multicast groups (Ipv4)	4k*
L3 Multicast groups (IPv6)	256*
Filters	256k*
Meters	2k*
Counters	2k*

Important: *maximum value - Actual values vary lower due to resource sharing

Chapter 20. DM4000 ETH4x10GX H Series

20.1. Overview

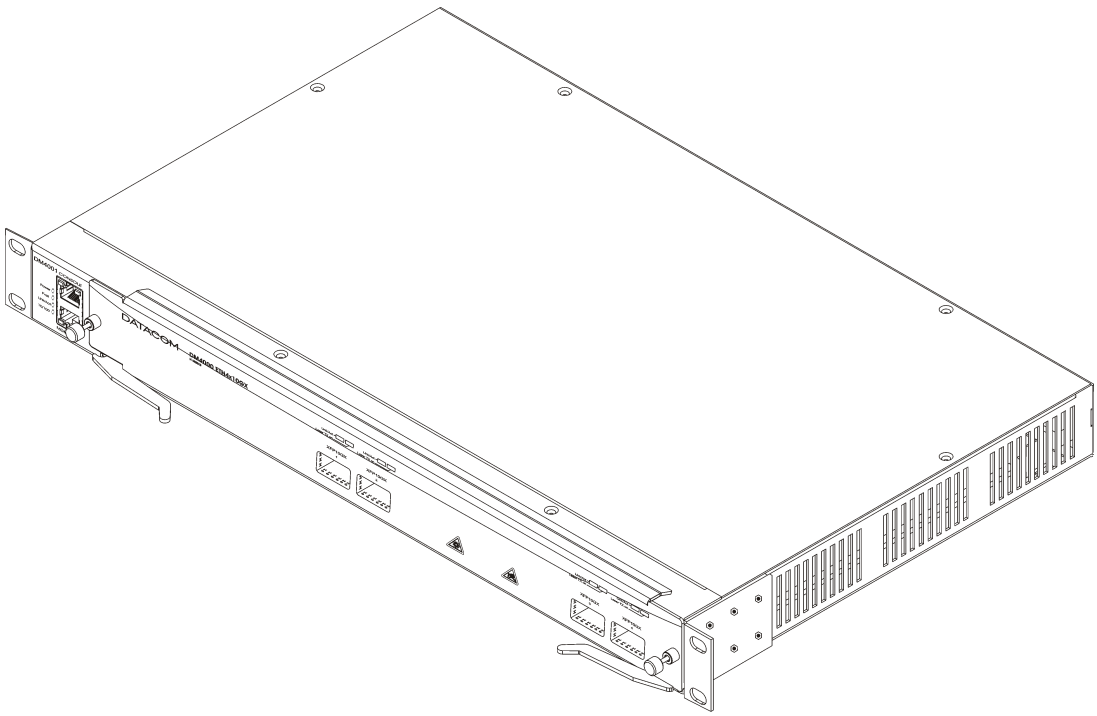
The DM4000 ETH4x10GX H Series is a non-blocking four 10 Gigabit XFP port interface board compatible with DM4001, DM4004 and DM4008 chassis

The DM4000 ETH4x10GX H Series can handle up to 59,523,808 packets per second supporting 12KB jumbo frames and has an internal 4MB Switching Memory supporting wire speed operation.

The DM4000 ETH4x10GX H Series has a 1GHz microprocessor with 1GB of RAM and 1GB of Flash.

The DM4000 ETH4x10GX H Series extensive Metro support can handle up to 524,288 MACs and larger L3 tables.

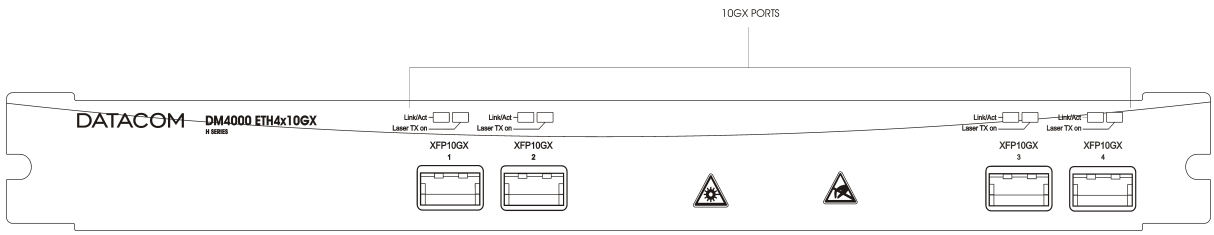
Figure 20-1. DM4000 ETH4x10GX H Series inside DM4001 Chassis



20.2. Front Panel Description

DM4000 ETH4x10GX H Series front panel contains 4 XFPs port and port status LEDs.

Figure 20-2. DM4000 ETH4x10GX H Series - Front Panel



WARNING:

"When performing installation and maintenance operations of optical fibers, you should not stand close or look directly into the fiber outlet with unaided eyes."

WARNING:

"Electrostatic generated by human body may damage the electrostatic sensitive components on the equipment."

WARNING:

"This interface board supports a 5A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value"

20.3. System Status LEDs

The DM4000 ETH4x10GX H Series has the following port status LEDs.

Table 20-1. ETH4x10GX H Series Port Status LEDs

LED	CONDITION	STATUS
Link/Act	ON/Blinking	Connection established. Blinking indicates port activity.
	OFF	No connection established.
10/100/1000	ON	Indicates that a 10/100Mbps connection was established.
	OFF	Indicates that a 1000Mbps connection was established.
Laser TX On	ON	Indicates that XFP TX laser is on.
	OFF	Indicates that XFP TX laser is off.

20.4. Software and Hardware Features

20.4.1. Software

Software information is available in a separated guide.

20.4.2. Hardware

Table 20-2. Hardware DM4000 ETH4x10GX H Series

Feature	Description
Switch L2	Wire Speed
Router L3	Wire Speed
QoS	L2-L4
MPLS	LDP/RSVP/L2VPN
VPLS	VPN Emulated LAN
VPWS	VPN Point-to-Point
PoE	N/A
Ports	4 x 10G (XFP)
Packet Buffer	4MB
Switch Fabric (intern)	80Gbps
Flash	1GB
RAM	1GB
MAC address table	512k*
L3 hosts (IPv4)	16k*
L3 hosts (IPv6)	8k*
L3 Routes (IPv4)	512k*
L3 Routes (IPv6 - 64b)	512k*
L3 Routes (IPv6 - 128b)	256k*
L2 Multicast groups	1k*
L3 Multicast groups (Ipv4)	4k*
L3 Multicast groups (IPv6)	256*
Filters	256k*
Meters	2k*
Counters	2k*

Important: *maximum value - Actual values vary lower due to resource sharing

Chapter 21. DM4000 GPC-OAB

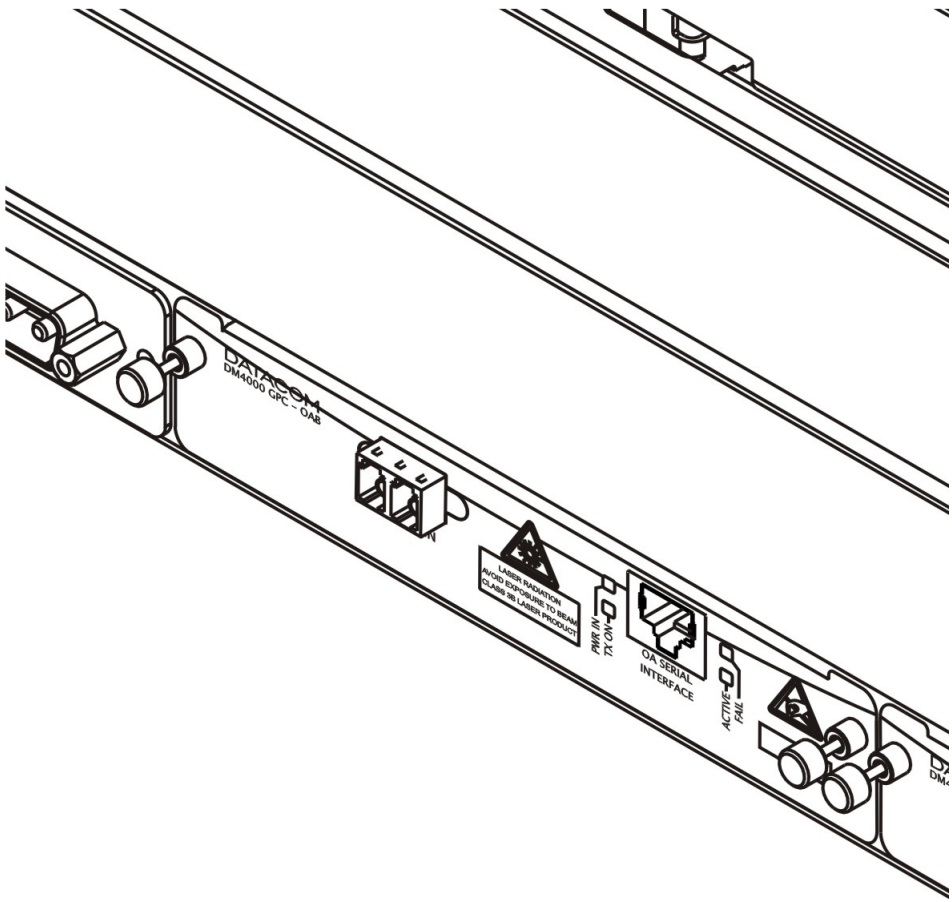
21.1. Overview

DM4000 GPC-OAB is an active booster amplifier based on erbium doped fiber (EDF). The module amplifies optical signals, allowing extension of optical loop up to 10 Gbit/s.

Booster's output power can be configured through terminal, management system or locally.

It can be managed by host equipment or directly. If the configuration jumper is on "AUTO" position, front serial interface is disabled and the configuration is executed by equipment. If the jumper is on "FORCED" position, the panel serial interface allows amplifier module's direct local configuration.

Figure 21-1. DM4000 GPC-OAB inside DM4004



CAUTION:

"Amplification module uses transmitters with no-visible class 3B laser radiation. Never look directly to the laser terminals or to the optical fiber. The exposure to the laser emission can cause total or partial loss of vision."

Parameters from DM4000 GPC-OAB

Table 21-1. Booster parameters

Parameters	Minimum	Typical value	Maximum	Unit
Wave length	1530	-	1562	nm
Input power	-10	-	+2	dBm
Output power	-	-	+15	dBm
Noise figure	-	-	8	dB
PDG	-	-	0.5	dB
PMD	-	-	0.5	ps

21.2. Front Panel Description

Figure 21-2. DM4000 GPC-OAB - Front Panel

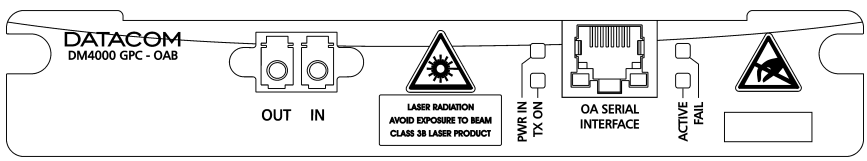


Table 21-2. DM4000 GPC-OAB Port Status LEDs

LED	STATUS
Power In	Equipment on.
TX On	Laser active.
Active	Managed by Central MPU.
Fail	Hardware fail.

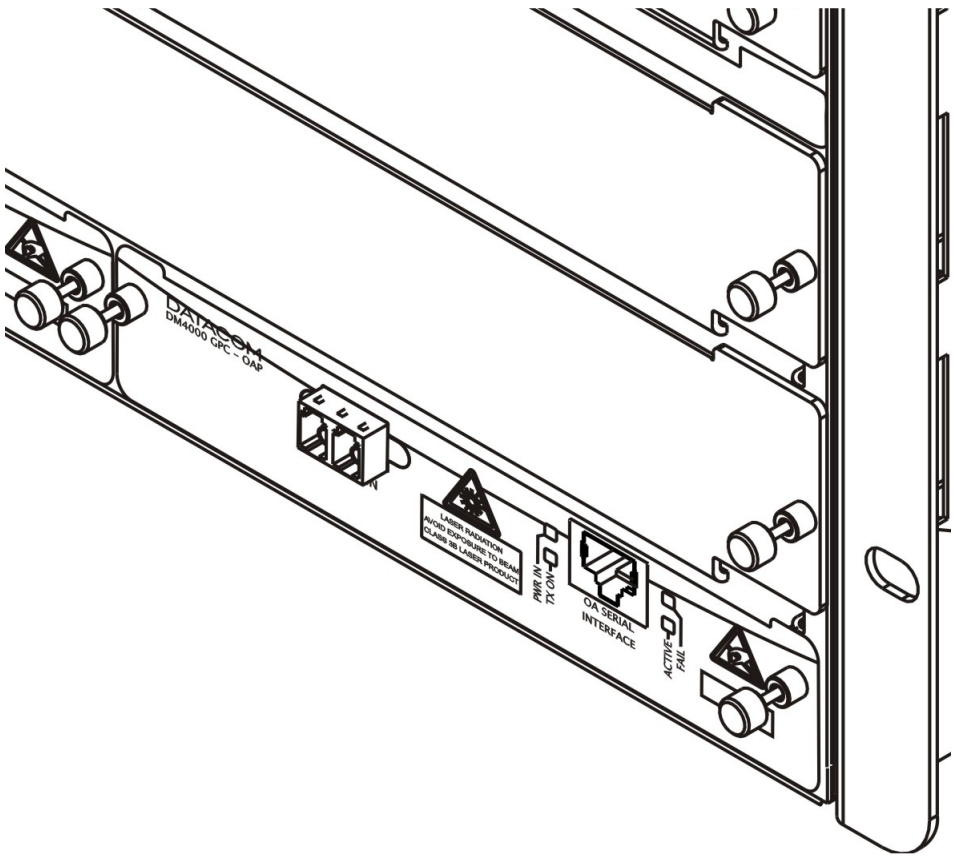
Chapter 22. DM4000 GPC-OAP

22.1. Overview

DM4000 GPC-OAP is an active pre-amplifier based on erbium doped fiber (EDF). The module amplifies attenuated optical signals, making possible its detection by receptor. DM4000 GPC-OAP allows extension of optical loop up to 10 Gbit/s.

It can be managed by host equipment or directly. If the configuration jumper is on "AUTO" position, front serial interface is disabled and the configuration is executed by equipment. If the jumper is on "FORCED" position, the panel serial interface allows amplifier module's direct local configuration.

Figure 22-1. DM4000 GPC-OAP inside DM4004



CAUTION:

"Amplification module uses transmitters with no-visible class 3B laser radiation. Never look directly to the laser terminals or to the optical fiber. The exposure to the laser emission can cause total or partial loss of vision."

Parameters from DM4000 GPC-OAP

Table 22-1. Pre-amplifier parameters

Parameters	Minimum	Typical value	Maximum	Unit
Wave length	-	1550.918	-	nm
Filter band	-	+/- 100	-	GHz
Input power	-35	-	-20	dBm
Output power	-	-5	-	dBm
Noise figure	-	-	6	dB
PDG	-	-	0.5	dB
PMD	-	-	0.5	ps

22.2. Front Panel Description

Figure 22-2. DM4000 GPC-OAP - Front Panel

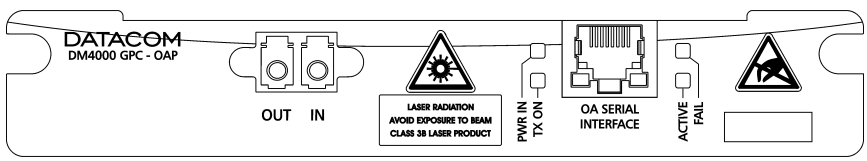


Table 22-2. DM4000 GPC-OAP Port Status LEDs

LED	STATUS
Power In	Equipment on.
TX On	Laser active.
Active	Managed by Central MPU.
Fail	Hardware fail.

Chapter 23. DM4000 GPC-DCM

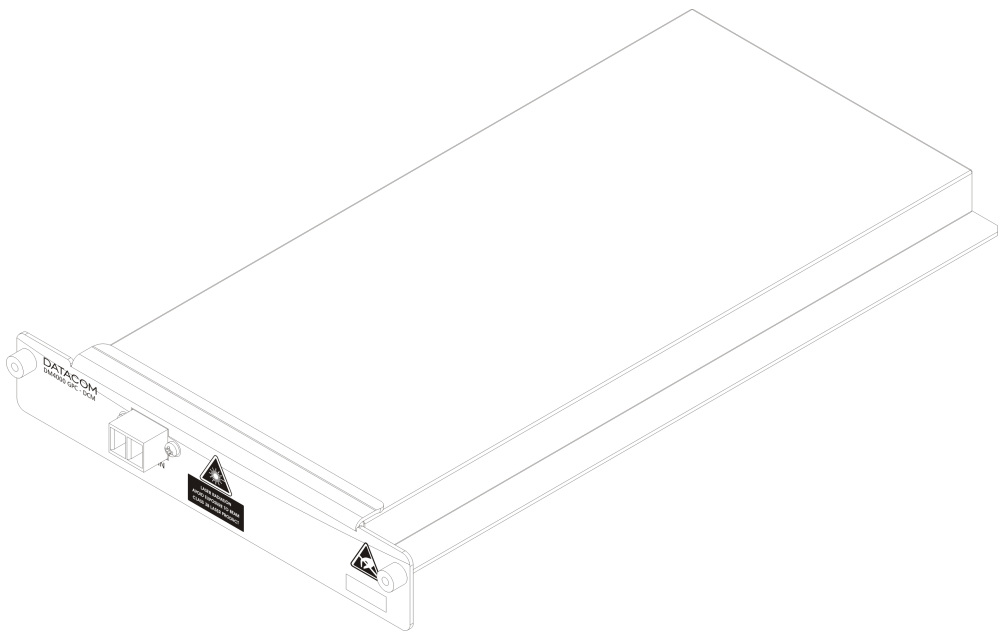
23.1. Overview

DM4000 GPC-DCM is an Dispersion-compensating Module. The module compensates 40 km of the dispersion of the fiber being used in a transmission system. Its optimized for use in Nondispersion-Shifted Fiber (ITU-T G.652).

The DM4000 GPC-DCM is a passive module and do not need to be powered to work.

The DM4000 GPC-DCM is designed to work with Transceivers that are design for DWDM, the Dispersion Level is not guaranteed for lambdas outside ITU-T DWDM Grid.

Figure 23-1. DM4000 GPC-DCM



CAUTION:

"Amplification module uses transmitters with no-visible class 3B laser radiation. Never look directly to the laser terminals or to the optical fiber. The exposure to the laser emission can cause total or partial loss of vision."

Parameters from DM4000 GPC-DCM

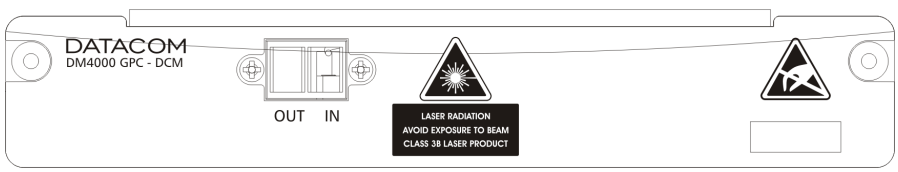
Table 23-1. DCM parameters

Parameter	Value	Unit
First Channel	1527.216	nm
	196.3	THz
Last Channel	1567.133	nm
	191.3	THz
Channel Spacing	100	GHz
Operation Bandwidth	ITU ± 17.5	GHz
Insertion Loss	< 4	dB
Dispersion Level	-665 *	ps/nm
Return Loss	> 40	dB
Polarization Dependent Loss	< 0.3	dB

* The Dispersion level of -665 ps/nm is the value for the middle of ITU Channel, for each channel the Dispersion Level vary to obtain the compensation of 40km G.652 fiber. Per example for the first channel the dispersion level is -619 ps/nm and the last channel is -712 ps/nm.

23.2. Front Panel Description

Figure 23-2. DM4000 GPC-DCM - Front Panel



Chapter 24. Fan Board

24.1. Description

The FAN module is used to avoid high temperature inside the equipment that may cause malfunction.

The FAN module is hot swappable. It can be replaced while the switch is active if necessary. But for safety reasons, it is recommended to be done with the chassis turned off.

WARNING:

"Don’t block FAN module airflow. Keep vents open and unobstructed."

WARNING:

"Don’t put your hands near to FAN module while the equipment is on."

When you put or take off the FAN module watch out where you touch. The figures below ilustrates where you should pay attention.

Figure 24-1. DM4004 FAN board without blank panels

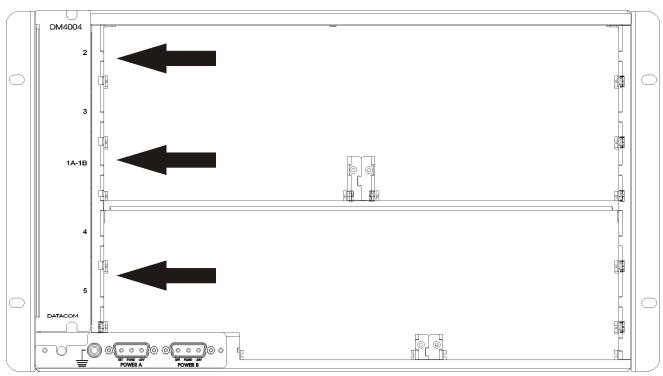
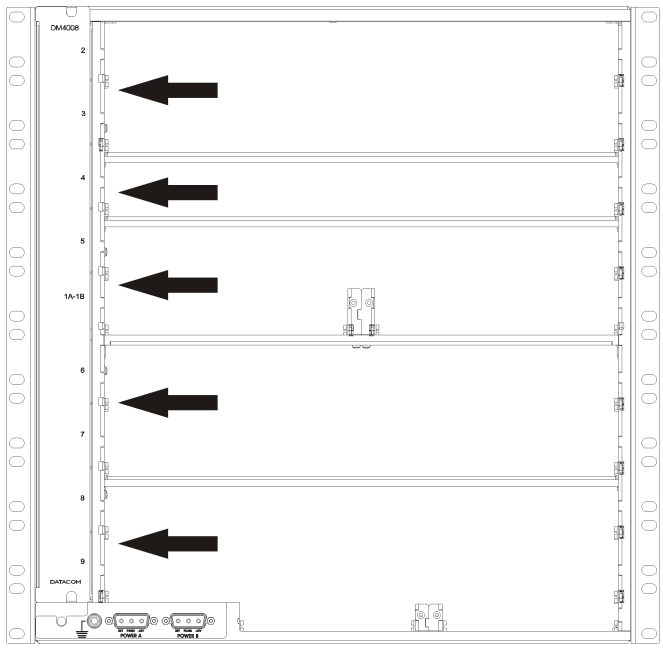


Figure 24-2. DM4008 FAN board without blank panels



24.2. Air Flow

The next figures show how the air flows inside DM4004 and DM4008 Chassis.

24.2.1. DM4004 and DM4008 Chassis

Figure 24-3. Air flow inside DM4004 19"

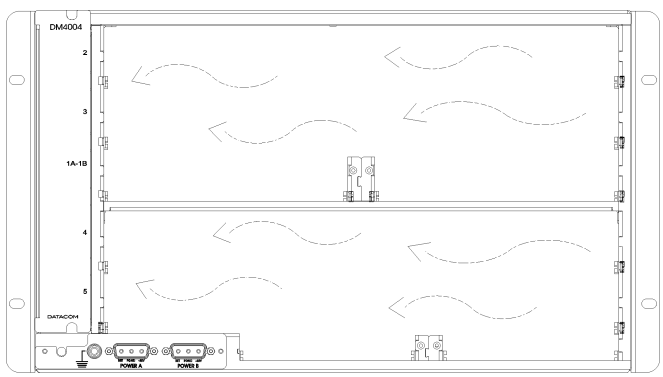


Figure 24-4. Air flow inside DM4004 23"

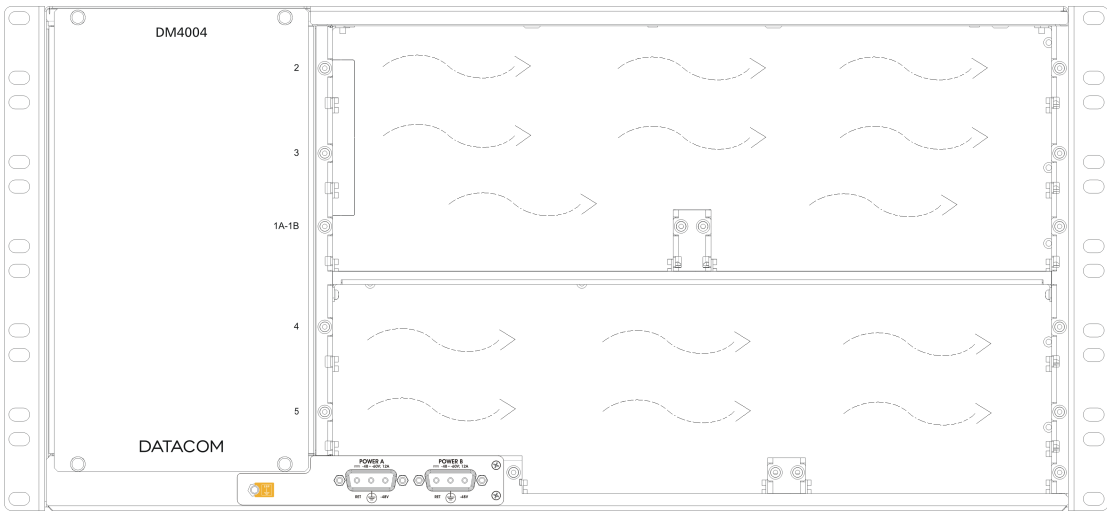
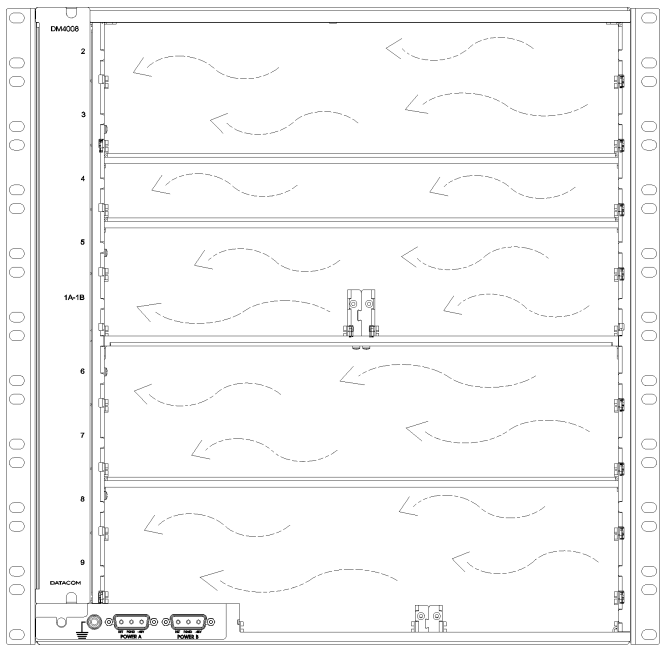


Figure 24-5. Air flow inside DM4008



Chapter 25. Installation Guide

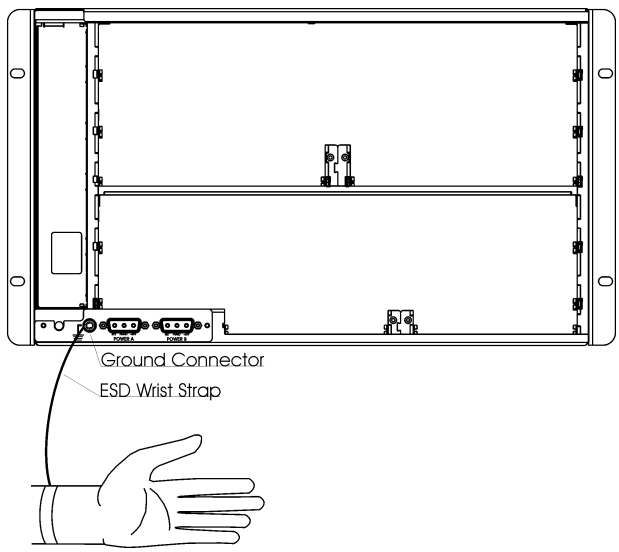
WARNING:

"Before touching the chassis, interface modules, MPUs or FAN modules a grounded electrostatic discharge (ESD) wrist strap should be used to prevent damage by the electrostatic contained in human body."

You can find ESD wrist strap in installation kit.

Look the following picture that shows how to put a ESD wrist strap in DM4004:

Figure 25-1. ESD wrist strap



25.1. Installation Kit

DM4004 and DM4008 come with an Installation Kit including:

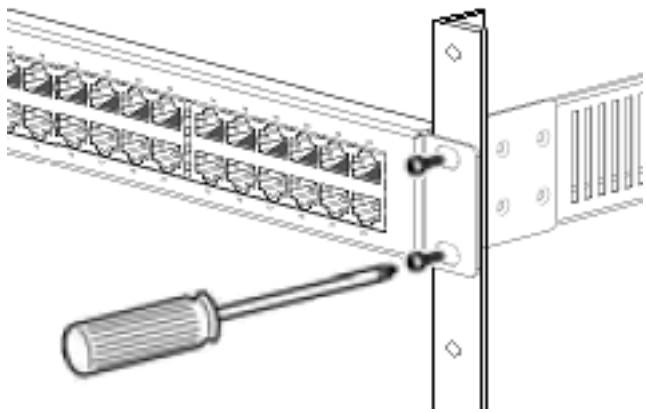
- 1 antistatic wrist strap

- 2 power supply connectors

- 1 console cable

To install the switch in a rack, use the following procedure and refer to the figure below:

Figure 25-2. Rack Mounting



WARNING:

"All slots that are not occupied with boards must be closed with a blank panel."

25.2. Powering the Switch

WARNING:

"Remember to attach the chassis to the ground before installing a power supply."

Follow the picture below to connect the power cable to the chassis properly.

Figure 25-3. DM4001 Power Supply Connector

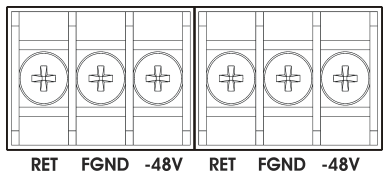
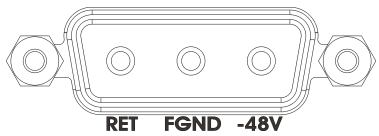


Figure 25-4. DM4004/DM4008 Power Supply Connector



WARNING:

"Just use the plug included in installation kit."

WARNING:

"The plug is the disconnection device on the equipment. The power outlet where the supply cable is connected must be positioned near the equipment and have easy access."

WARNING:

"In case of using DC voltage, be careful so that the equipment protection ground (green cable with yellow line related to the central socket pin) matches the system protection ground. This cable must be connected before any other connection. The metallic structure of the equipment is connected to the protection ground cable."

WARNING:

"Consult the table about the type of fuse used in each interface module. If necessary, replace it only for another one of the same type and value."

25.2.1. Cables

Table 25-1. Cable dimension according chassis

Chassis	Current max.	Minimum conductor sizes	
		Nominal cross-sectional area	AWG [cross-sectional area in mm2]
DM4001	2,5A	1,5mm2	14 [2 mm2]
DM4004	12,5A	2,5mm2	12 [3 mm2]
DM4008	22A	4mm2	10 [5 mm2]

25.2.1.1. Build Information from DM4001 power connector and DM4004/DM4008 power connector

To connect the equipment, you should connect power supply to D-metro connector type 3W3 (-48/-60Vdc, Ground, Return - 0V), DC input (-48/-60Vdc).

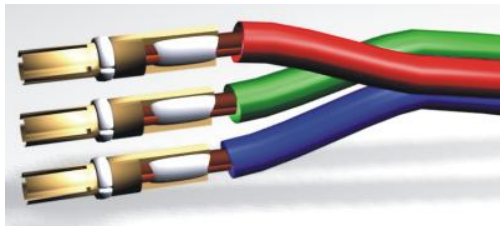
Are necessary the follow itens to build the power supply cable, according chassis cable dimensions:

- 2 mm2, 3 mm2 or 5 mm2 section area cable - Red (Return)
- 2 mm2, 3 mm2 or 5 mm2 section area cable - Blue (-48/-60Vdc)
- 2 mm2, 3 mm2 or 5 mm2 section area cable - Green with Yellow Stripes (Ground)
- Thermocontractile Tube 4,8/2,4mm
- Connector cape DB3W3*
- Female connector DB3W3 without pins*
- Female connector DB Pin Power 40A (3 pins per connector)*

*These itens are provided by DATACOM with the equipment

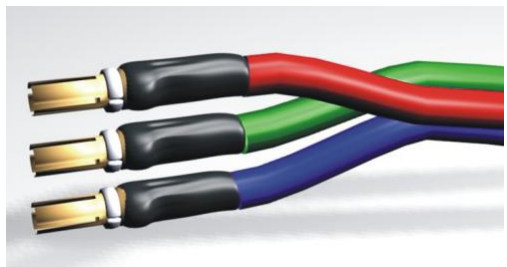
To build the cable, solder a female pin in each power supply cable end, like the picture below:

Figure 25-5. Connector soldered



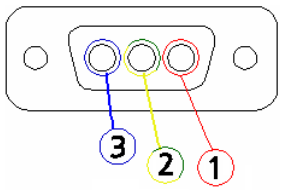
Next, isolate parts soldered in a way that pins don't touch themselves when installed in connector. The detail is shown below:

Figure 25-6. Connector isolated



Next, plug pins inside connector. Pins should be inserted behind the connector until the hang plug, setting pins like the picture below:

Figure 25-7. Cable disposition - Front view



1) Return (0V)

2) Ground

3) Phase (-48/-60Vdc)

Finally, build the cape around the connector.

WARNING:

"Observe wires disposition in connector, see picture above."

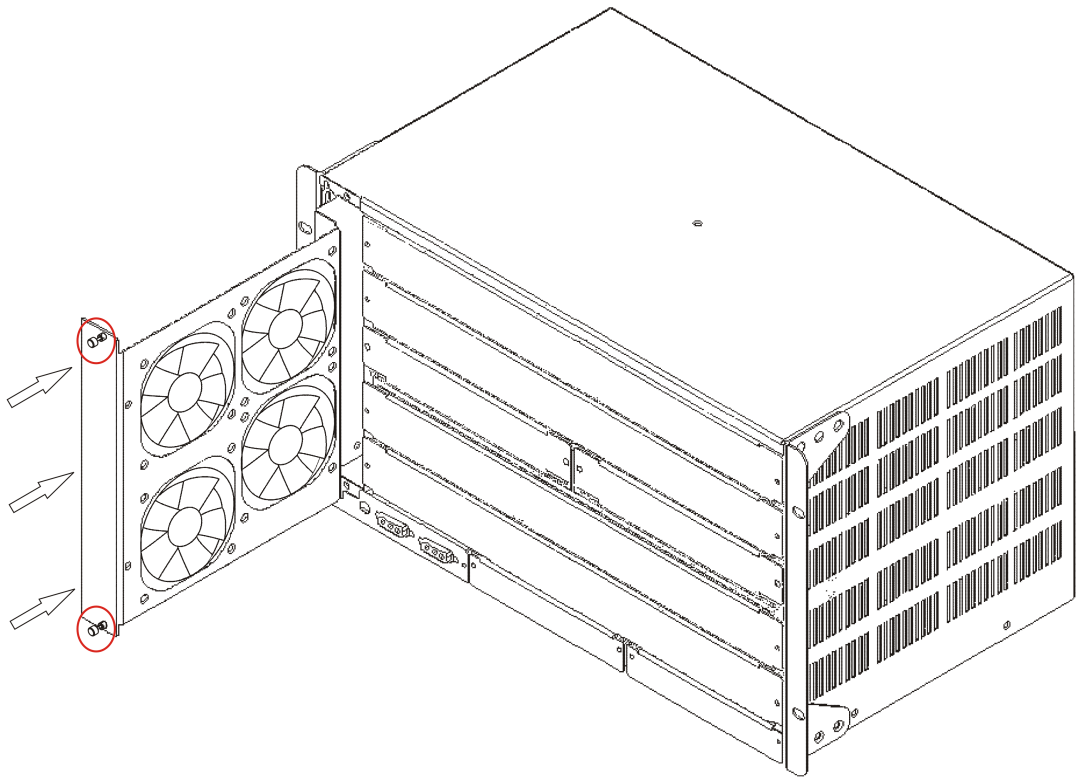
25.3. Installing the FAN Module in the Chassis

Push the FAN module by the screws shown in red circles.

WARNING:

"Don’t put your fingers inside the FAN module when the equipment is powered on"

Figure 25-8. FAN Module Installation



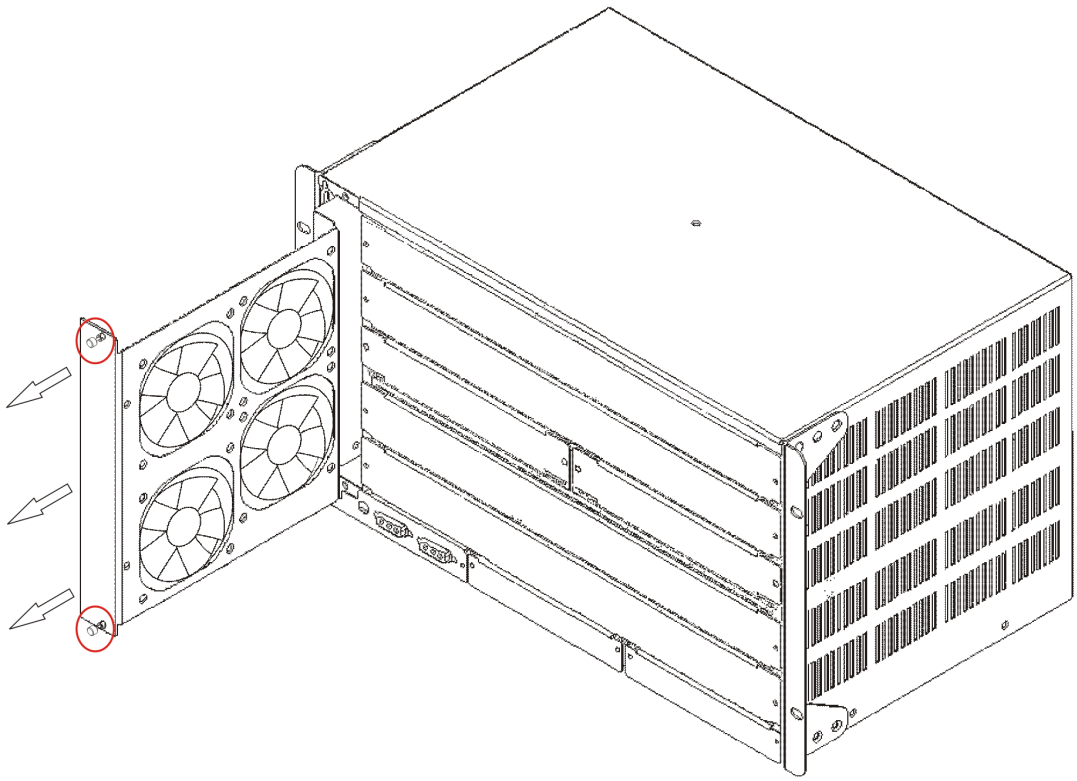
25.4. Removing the FAN Module of the Chassis

Pull the FAN module by the screws shown in red circles.

WARNING:

"The FAN module takes a few seconds to completely stop. Don’t put your fingers inside the FAN module immediately after the equipment is powered off"

Figure 25-9. FAN Module Removal



25.5. Inserting the Interface Board in the Chassis

The following picture ilustrates the correct insertion of a DM4000 interface module into the DM4004 or DM4008 chassis.

According to the figure to insert a ETH48GT inside DM4001, for example, the installation sequence is:

Figure 25-10. Step 1 - Ejector levers should be located to rabbet in chassis

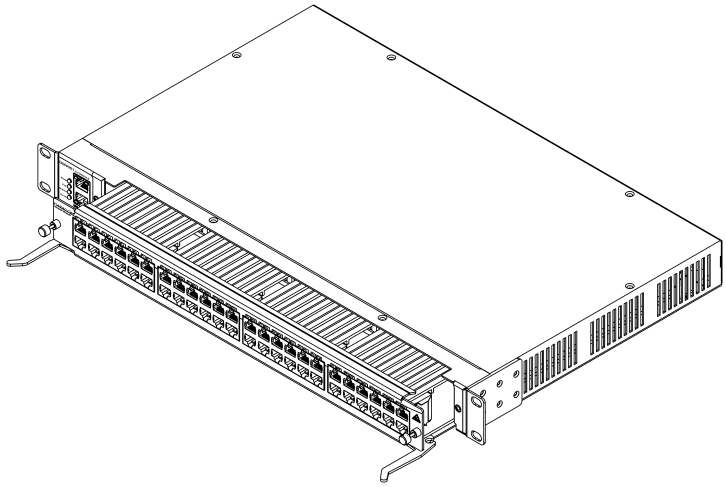


Figure 25-11. Step 2 - Ejector levers should be located after the board

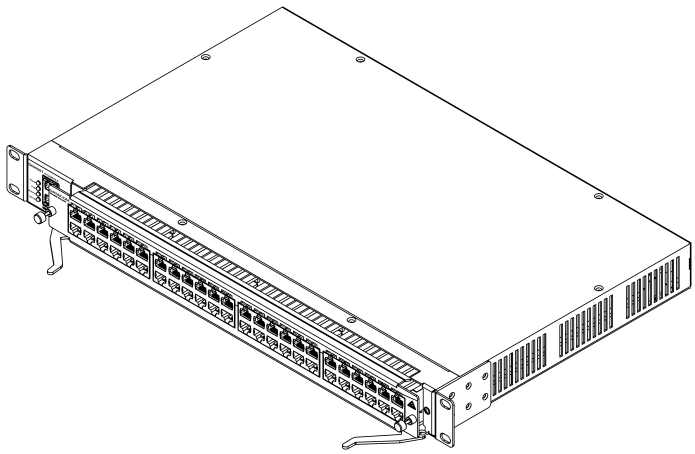
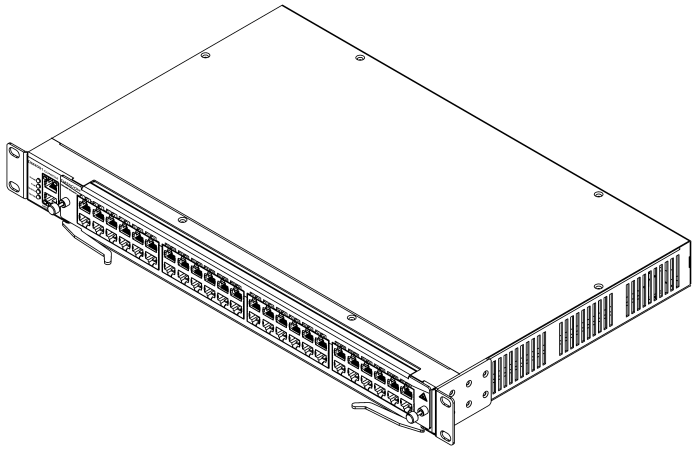


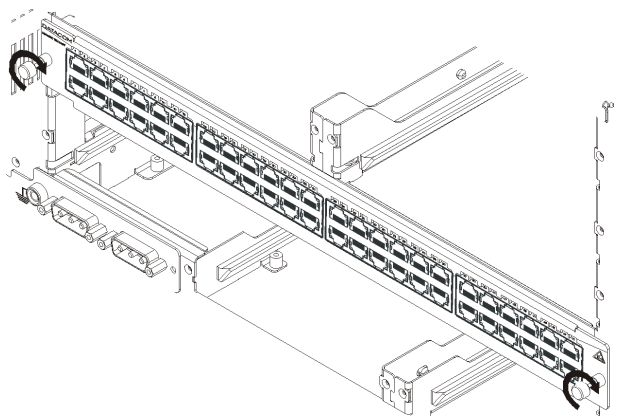
Figure 25-12. Step 3 - Press the ejector levers to chassis



1. Ejector levers should be located to rabbet in chassis
2. Ejector levers should be located after the board
3. Press the ejector levers to chassis

After the interface board is properly inserted in the chassis, tighten the knurling screws as shown in the following picture.

Figure 25-13. DM4004 Mounting

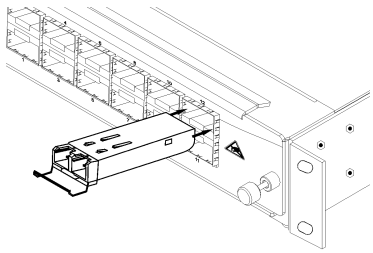


25.6. SFP Module

25.6.1. Connecting a SFP Module

The use of a SFP transceiver is optional. It is not included in the package. Follow the next instructions to install a SFP module properly:

Figure 25-14. Connecting an optical SFP Module in an interface board



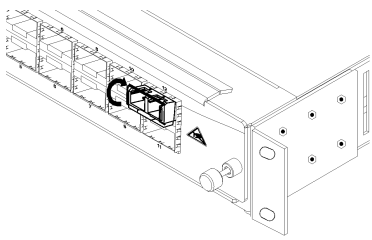
1. Insert the SFP transceiver into any of the switch module bays. There's only one orientation that the module can be plugged. The optical connector should face outward. The slot connector should face down for the upper bays, and up for the lower bays.
2. Slide the module into the slot and press firmly to ensure it is securely in place.

NOTE:

"Inserting or removing a SFP module can be done without powering off the switch. SFP transceivers are hot-swappable, but make sure there are no network optical cords connected to the module before removing it! (Remove optical cords before removing SFP modules)."

After this, attach the security locker according to the figure below:

Figure 25-15. Locking an optical SFP Module in an interface board



The SFP modules that can be used with DM4000 Series Switches and each respective maximum fiber length are described in the table below:

Table 25-2. Gigabit SFP Modules

SFP Module	Fiber Type	Maximum Length
1000BASE-SX	multimode	550m
1000BASE-LX	singlemode	10km
1000BASE-LX+	singlemode	30km
1000BASE-LH	singlemode	80km
1000BASE-LZ	singlemode	120km

"These modules are the most used. Contact technical support for the complete and updated SFPs module list."

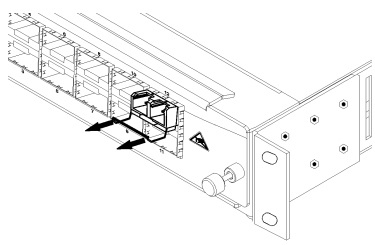
WARNING:

"Signals over fiber optic cables are transmitted via lasers. Although the lasers are compliant with the requirements of Class 1 Laser Products and are eye safe in normal conditions, never look directly at a transmit port when it is turned on!"

25.6.2. Removing SFP Modules

To remove SFP modules follow the instructions below:

Figure 25-16. Removing an optical SFP Module from an interface board



1. Remove the fibers
2. Release the security locker
3. Pull off the module through the locker

25.6.3. Transceivers Homologation Check

DATACOM transceivers are tested to comply with IEEE802.3z and LASER safety standards. Non-homologated transceivers do not guarantee compliance and may damage the Interface Board hardware. DATACOM's software checks for homologated transceivers before starting traffic and blocks non-homologated transceivers. Please contact technical support about risks and availability of unblock key password.

Appendix A. Cable DB9-RJ-45

A.1. Construction

To build a cable DB9-RJ-45 you need to connect the pins shown in the below, this cable will serve to command the MPUs and standalone chassis by serial port.

Also, see the pins in the next pictures.

Figure A-1. RJ-45 Pins

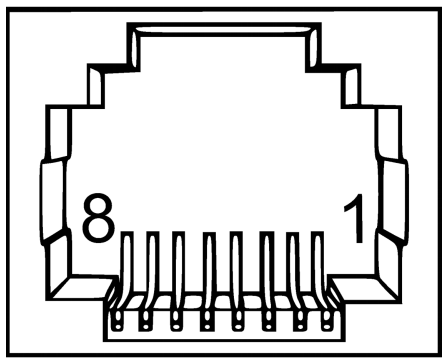


Figure A-2. DB9 Pins

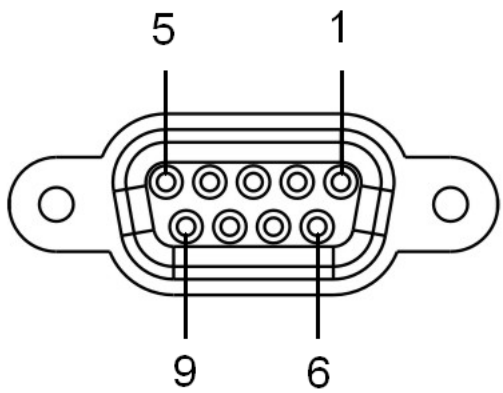


Table A-1. Cable DB9-RJ-45

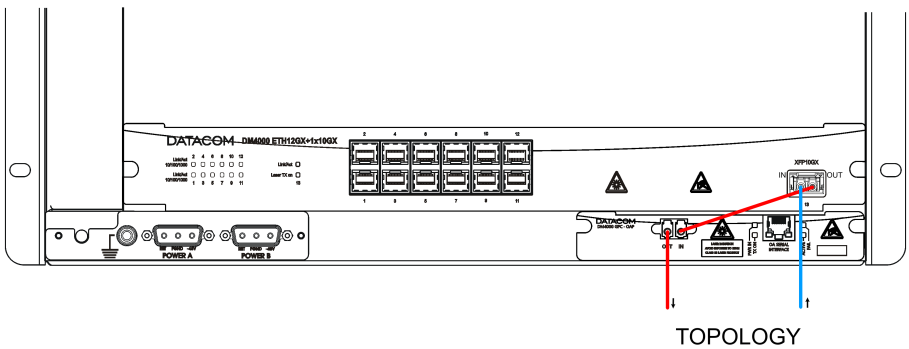
Pin RJ-45 (Number-color)	Pin DB9
1-Light Green	8
2-Dark Green	6
3-White	2
4-Dark Blue	5
5-Light Blue	5
6-Orange	3
7-Pink	4
8-Brown	7

Appendix B. Optical Amplifiers

B.1. How to connect an optical amplifier and a interface board

An optical amplifier board is used to amplify a transmission signal that will travel a long distance, in that way avoiding data loss during the course. The EDFA (Erbium Doped Fiber Amplifier) based boards can be used with 1G or 10G ports and operate with wavelenghts of 1530nm at 1562nm. For this, you need to connect the output from transceiver to the input IN from EDFA and connect the output OUT from EDFA to the topology. An example is shown below:

Figure B-1. Connection between an ETH12+1x10GX and a GPC-OAB



Note: Be careful to not connect the output from transceiver to output OUT from EDFA.

EDFA board has +10dB power, if it will be used in stand tests is require to use an attenuator of 15db or a 60Km optical fiber. This avoid transceiver receptor to be damaged.

Appendix C. Applicable Standards

C.1. Applicable Standards for DM4000 family

Table C-1. Applicable Standards

Specification	Description
EMC	CISPR-22 Class A
	FCC Class A
EMI	CISPR-22 Class A
	FCC Class A
Safety	IEC 90050